ALL INDIA CO-ORDINATED RESEARCH PROJECT
on
Vegetable Crops

PROCEEDINGS OF XXXVI GROUP MEETING

held at

RARI - Durgapura, Jaipur, Rajasthan

18th – 21st May, 2018






भा.कृ.अनु.प.–भारतीय सब्जी अनुसंधान संस्थान
ICAR-Indian Institute of Vegetable Research
वाराणसी - 221305
Varanasi - 221305

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ICAR-INDIAN INSTITUTE OF VEGETABLE RESEARCH
VARANASI – 221 305

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ALL INDIA COORDINATED RESEARCH PROJECT ON VEGETABLE CROPS
XXXVI GROUP MEETING OF VEGETABLE RESEARCH WORKERS TO BE HELD AT RARI, DURGAPURA, FROM 18TH TO 21TH MAY, 2018

AGENDA

Date	**Time (Hr.)**		
18.05.2018	**09:00-10:00**	**REGISTRATION**	
TECHNICAL SESSIONS			
	(Review of work done, recommendation and finalization of Technical Programme)		
	10:00-11:30	**Inauguration**	
		ICAR Song	
		Welcome	Dr. S.J.Singh, Director, RARI
		About the University	Dr. V. K. Yadav, Director Research, SKNAU, Jobner
		Project Coordinator's Report	Dr. A.B. Rai, I/c PC, AICRP (VC)
		Remarks	Dr. B. Singh, Director, ICAR-IIVR
		Remarks	Dr. Janikiram, ADG (HS), ICAR
		Key Note Address	Dr. A.K. Singh, DDG (HS), ICAR
		Presidential Address	Prof. P.S. Rathore, Vice Chancellor, SKNAU, Jobner
		Inaugural Address	Chief Guest
		Vote of Thanks	Dr. V.S. Yadav, Organizing Secretary
	11:30-12:00	**HIGH TEA**	
	12:00-13:00	**Session-I : Performance Evaluation**	
		Chairperson	Dr. T. Jankiram, ADG (HS), ICAR
		Co-Chairman	Dr. B. Singh, Director, ICAR-IIVR
		Convener	Dr. S.K. Verma, Principal Scientist, ICAR-IIVR
		Rapporteur	Dr. B.K. Singh, Scientist, ICAR-IIVR
			Dr. B. Rajasekhar Reddy, Scientist, ICAR-IIVR
		Action taken report	Dr. A.B. Rai, I/c, AICRP(VC)
	13:00-13:45	**Lunch Break**	
	13:45-15:45	**Session-II : Collection, Conservation & Evaluation of Germplasm**	
		Chairperson	Dr. J.C. Rana, International Bioversity
		Co- Chairperson	Dr. C.S. Pathak, Nath Biogene, Aurangabad
		Convener	Dr. D.R. Bhardwaj, Principal Scientist, ICAR-IIVR
		Rapporteur	Dr. R.K.Yadav, Principal Scientist, ICAR-IARI, New Delhi
			Dr. Jyoti Devi, Scientist, ICAR-IIVR
	15:45-16:00	**Tea Break**	
	16:00-18:00	**Session-III : Varietal Evaluation**	
		Chairperson	Prof. G. Kalloo, Ex. Vice Chancellor, JNKVV, Jabalpur
		Co- Chairperson	Dr. A.S. Dhatt, Professor, PAU
		Convener	Dr. B. K. Singh, Scientist, ICAR-IIVR
		Rapporteur	Dr. T.K. Behara, Principal Scientist, ICAR-IARI
			Dr. Pradeep Karmakar, Scientist, ICAR-IIVR
19.05.2018	**9:30-11:30**	**Session-IV : Hybrid Evaluation**	
		Chairperson	Dr. K. E. Lawande, Ex. Vice Chancellor, Dapoli
		Co- Chairperson	Dr. S.J. Singh, Director, Durgapura
		Convener	Dr. N. Rai, Principal Scientist, ICAR-IIVR
		Rapporteur	Dr. B.K. Singh, Scientist, ICAR-IIVR
			Dr. H. Choudhary, PS, ICAR-IARI

	9:30-11:30	**Session-VI : Vegetable Production**	
		Chairperson	Dr. Kirti Singh, Ex. Chairman, ASRB
		Co- Chairperson	Dr. S.K. Sharma, Dean, College of Agri., Sikkim
			Dr. Gopal Lal, Director, Ajmer
		Convener	Dr. S.K. Singh, Principal Scientist, ICAR-IIVR
		Rapporteur	Dr. S.K. Singh, Principal Scientist, ICAR-IIVR
			Dr. Nirmala Devi, Professor, KAU
	11:30-11:45	**Tea Break**	
	11:45-13:00	**Session-V Evaluation for Biotic and Abiotic Stresses**	
		Chairperson	Dr. K.V. Peter, Ex. Vice Chancellor, KAU
		Co- Chairperson	Dr. A.T. Sadashiva, Head, ICAR-IIHR, Bengaluru
		Convener	Dr. Pradeep Karmakar, Scientist, ICAR-IIVR
		Rapporteur	Dr. Arup Chattopadhya, Professor, BCKV
			Dr. Vikas Singh, Senior Scientist, ICAR-IIVR
	11:45-13:00	**Session-VIII : Physiology, Biochemistry and Processing**	
		Chairperson	Dr. D.P. Ray, Ex. Vice Chancellor, OUAT
		Co- Chairperson	Dr. Jagdish Singh, Head, ICAR-IIVR
		Convener	Dr. Sudhir Singh, Principal Scientist, ICAR-IIVR
		Rapporteur	Dr. Neena Chawala, Professor, PAU
	13:00-13:45	**Lunch Break**	
	13:45-15:45	**Session-IX : Insect Pest Management**	
		Chairperson	Dr. D.B. Ahuja, Ex-Director, NCIPM
		Co- Chairperson	Dr. A.B. Rai, I/c, AICRP(VC) Dr.A.S.Baloda, Professor, RARI, Durgapura
		Convener	Dr. Manjunath Gowda, Scientist, ICAR-IIVR
			Dr. Jaydeep Halder, Scientist, ICAR-IIVR
		Rapporteur	Dr. Manjunath Gowda, Scientist, ICAR-IIVR
			Dr. S.A. Pawar, Junior Entomologist, MPKV, Rahuri
	13:45-15:45	**Session-VII : Disease Management**	
		Chairperson	Dr. M.K. Reddy, Head, ICAR-IIHR
		Co- Chairperson	Dr. A.S. Mathur, Professor, RARI, Jaipur
		Convener	Dr. K.K. Pandey, Principal Scientist, ICAR-IIVR
		Rapporteur	Dr. Abhishek Sharma, Associate Professor, PAU
			Dr. A.N. Tripathi, Scientist, ICAR-IIVR
	15:45-16:00	**Tea Break**	
	16:00-18:00	**Session: XIII Protected Cultivation**	
		Chairperson	Dr. Brahma Singh, Ex. Director, DRDO
		Co- Chairperson	Dr.D.K.Singh, Prof., GBPUA&T
		Convener	Dr.R.N. Prasad, Principal Scientist, ICAR-IIVR
		Rapporteur	Dr. S.S. Hebbar, Principal Scientist, ICAR-IIHR
			Dr. S.K.Sanwal, Principal Scientist, ICAR-CSSRI
20.05.2018	**9:30-11:30**	**Session-X : Seed Production**	
		Chairperson	Dr. Balraj Singh, Vice Chancellor, Jodhpur University
		Co- Chairperson	Dr. S.K. Tripathi, Nuzuveedu Seeds
			Dr. B.S. Tomar, Head, ICAR-IARI
		Convener	Dr. Rajesh Kumar, Principal Scientist, ICAR-IIVR
		Rapporteur	Dr. Manimurgan, Scientist, ICAR-IIVR
			Dr. Rajinder Singh, Professor, PAU

	11:30-11:45	**Tea Break**	
	11:45-13:00	**Session-XI : Breeder Seed Production and Price Fixation**	
		Chairperson	Dr. B. Singh, Director, ICAR-IIVR
		Co- Chairperson	Dr. A.T. Sadashiva, Head, ICAR-IIHR, Bengaluru
		Convener	Dr. Manimurgan, Scientist, ICAR-IIVR
		Rapporteur	Dr. D.P. Singh, Professor, CSAUA&T, Kanpur
			Dr. Vikas Singh, Senior Scientist, ICAR-IIVR
	13:00-13:45	**Lunch Break**	
	13:45-15:00	**Session-XII : Public Private Interface (Discussions with Private Sector)**	
		Chairperson	Dr. Brahma Singh, Ex. Director, DRDO
		Co- Chairperson	Dr. C. S Pathak, Nath Bio-gene (I) Ltd.
		Convener	Dr. T.S. Aghora, Principal Scientist, ICAR-IIHR
		Rapporteur	Dr. T.S. Aghora, Principal Scientist, ICAR-IIHR
			Dr. Pradeep Karmakar, Scientist, ICAR-IIVR
	15:45-16:00	**Tea Break**	
	16:00-18:00	**Discussion : Technical Programme**	
21.05.2018	**10:00-13:00**	**Plenary Session**	
		Chairperson	Dr. A.K. Singh, DDG (HS), ICAR
		Co- Chairperson	Dr. T. Jankiram, ADG (HS), ICAR
			Dr. B. Singh, Director, ICAR-IIVR
		Convener	Dr. A.B. Rai, I/c PC, ICAR-IIVR
		Rapporteur	Dr. S.K. Verma, Principal Scientist, ICAR-IIVR
			Dr. B.K. Singh, Scientist, ICAR-IIVR
		Presentation of reports of Technical Sessions	
		Finalization of Technical Programme	
		Concluding remarks : Dr. A.K. Singh, DDG (Hort. Sci.), ICAR, New Delhi	
		Vote of thanks	
	13:00-13:45	**Lunch Break**	
	13:45-16:00	**Visit to RARI experimental farm**	

SESSION I

Performance Evaluation

Chairperson	:	Dr. T. Jankiram, ADG (HS) , ICAR, New Delhi
Co-Chairman	:	Dr. B. Singh, Director, ICAR-IIVR, Varanasi
Convener	:	Dr. S.K. Verma, Principal Scientist, ICAR-IIVR, Varanasi
Rapporteur	:	Dr. B.K. Singh, Scientist, ICAR-IIVR, Varanasi
	:	Dr. B. Rajasekhar Reddy, Scientist, ICAR-IIVR, Varanasi
Action taken report	:	Dr. A.B. Rai, PC, AICRP (VC), ICAR-IIVR, Varanasi

At the outset, Chairperson Dr. T. Jankiram, ADG (HS), ICAR, New Delhi welcomed the delegates and participants. He stressed on importance of protected cultivation and also shared his experiences regarding Chinese way of protected cultivation and plant factories pertaining to vegetable crops. It was suggested to develop pre-breeding lines to fulfil the future requirements of impending climate change scenario. He also emphasised that soil less and vertical cultivation of vegetable production should be encouraged. Thereafter, the Chairperson invited Dr. A.B. Rai, PC, AICRP (Vegetable Crops) to present the action taken report on the recommendations made during XXXV workshop.

The following suggestions emerged during the deliberations:

- Every breeder/centre should get IC number from NBPGR, New Delhi for developed/collected germplasm. **(Action: All concerned centres)**
- Reporting on new germplasm should be progressive basis. **(Action: All concerned centres)**
- Germplasm sharing should be facilitated on the basis of MTA provided by the centres and records should be updated. **(Action: Concerned centres)**
- Advance planning (1-2 years in advance) should be made for providing entries to AICRP trials. **(Action: All concerned centres)**
- CMS/CGMS/GMS lines should be shared following the MTA norms to facilitate faster hybrid development. **(Action: Concerned centres)**
- Residue analysis required for AICRP (VC) trials should be taken by National Referral/ accredited Laboratories. **(Action: PC cell)**
- After collection, evaluation and conservation of vegetable germplasm its utilization record should also be kept in order. **(Action: Concerned centres)**

The session ended with a vote of thanks to the chair.

SESSION-II

Collection, Evaluation, Conservation and Utilization of Germplasm

Chairperson	:	Dr. J.C. Rana, National Coordinator (GEF), Bioversity International
Co-Chairperson	:	Dr. C.S. Pathak, Nath Biogene, Aurangabad
Convener	:	Dr. D. R. Bhardwaj, ICAR-IIVR, Varanasi
Rapporteurs	:	Dr. R. K. Yadav, ICAR-IARI, New Delhi Dr. Jyoti Devi, ICAR-IIVR, Varanasi

At the outset, Dr. J.C. Rana, National Coordinator (GEF), Bioversity International, Chairperson of the session, welcomed the delegates and highlighted the importance of genetic resources for strengthening the future breeding programme in vegetable crops. He also informed that India being one of the mega diversity centers, possesses rich diversity in agri-horticultural crops particularly vegetable crops. There are many more vegetables, where attention has not been paid, should be given priority for exploration, collection, evaluation and conservation.

The Chairperson invited Dr. D.R. Bhardwaj, Principal Scientist, ICAR-IIVR to present the PGR activities being carried out at different institutes and ICAR-NBPGR headquarters and its regional stations. Dr. Bhardwaj presented the germplasm evaluation report submitted by different centers during 2016-17 and 2017-18. A total of 93 germplasm trials were allotted during the year 2016-17 to different centers, out of which 82 (88.17%) trials have been reported. During the year 2017-18, out of 102 germplasm evaluation trials allotted to different centers, 49 (48.03%) trials have been reported and 45 (44%) trials are in progress. During the reporting period, ICAR-NBPGR alongwith other institutes carried out 18 exploration missions and collected 443 germplasm accessions of different vegetable crops. NBPGR introduced 5211 accessions (including wild relatives), characterized and evaluated ~1750 accessions and conserved 1810 accessions in the National Gene Bank during 2017-18. List of promising germplasm accessions available at different centers is given in *Annexure I*.

Dr.B.Singh, Director, ICAR-IIVR emphasized that under vegetable genetic resources, newer crops/future crops, may also be given due attention for its collection, evaluation and conservation. Dr.C.S.Pathak stressed on trait specific germplasm identification at NBPGR and other associated organizations so that within short span of time genetic resource can be utilized for development of varieties. He also emphasized the need of exotic germplasm suitable for domestic and global markets. Dr.G.Kalloo while interacting in the session, suggested to focus on specific biotic and abiotic stresses emerging due to climate change. Dr. A.B. Rai, officiating Project Coordinator, AICRP (VC) formulated a committee of the following members to finalize the technical program for the year 2018-19:

1. Dr. C. S. Pathak (Chairman)	7. Dr. Bindhyachal Prasad
2. Dr. S.K. Verma	8. Dr. T.K. Behara
3. Dr. T.S. Aghora	9. Dr. R. K. Yadav
4. Dr. D. R. Bhardwaj	10. Dr. Jyoti Devi
5. Dr. K. K. Gangopadhyay	11. Dr. Lakshman
6. Dr. R.S. Pan	

The recommendations and action points made during the session are given below:

1. It was emphasized that vegetable crops germplasm available with NBPGR National Gene Bank need to be evaluated for enhanced utilization. To this effect, a network program should be initiated for evaluation of germplasm with special focus on national problems in vegetable crops like leaf curl in chilli, tospo virus in tomato, YVMV and ELCV in okra etc. for biotic stresses; heat and moisture stress under abiotic stresses and for quality traits like TSS, β carotene, lycopene, capsaicin etc.

   (Action: PC, AICRP-VC)

2. All the centres should obtain IC number for all the germplasm accessions including advanced stable breeding lines available with them and information be submitted to PCCell. PC (AICRP-VC) should ensure completing this activity within two years.

   (Action: PC, AICRP-VC; All Centres)

3. The material generated through pre-breeding in vegetable crops should be reported.

   (Action: All Centres)

4. The germplasm evaluation trials for various agronomic traits as well as biotic and abiotic stresses should be executed following proper methodology as per technical programme. The trials for biotic stresses should be carried out at hot spots and for abiotic stresses at centres having adequate infrastructure facilities. A set of evaluation descriptors should be prepared by PC Cell in consultation with NBPGR, IIVR, IIHR and IARI, etc. to facilitate for uniform reporting.

   (Action: PC, AICRP-VC)

5. The future germplasm exploration programs should be carried out with compulsory participation of indenting Institute. It was also suggested to collect trait specific accessions and more diversity within the wild species.

   (Action: PC, AICRP-VC; Director, NBPGR)

6. Elite genotypes identified should be distributed among the breeders for utilization in the breeding programme through MTA.

   (Action: All Centres; PC, AICRP-VC)

Annexure-I

List of promising germplasm available with different centers (2016-17)

Crops	Centre (Accessions)	Notable/Promising germplasm
Amaranth	IIVR (7)	Biomass yield (Green) (q/ha): AMVAR-1 (206.53)
	Vellanikkara (20)	Yield (Red) (g/plant): VKA 110(460)
Bitter gourd	Rahuri (20)	Fruit fly tolerance: RHRBG-5 (5.08%)
	Vellanikkara (12)	Yield: VKB-176 (2.25 kg/plant)
	IIVR (10)	IC391819: Fruits/plant-39.5, white smooth, fruit wt. 55.00g VRBTG-10 (Suitable for chips making)
Bottle gourd	Rahuri (20)	RHRBG-1 (358.00 q/ha), RHRBG-3 (343.62 q/ha), RHRBG-4 (Downy mildew- 12.20%)
	IIVR (10)	VRBG-63-4 (high yield and oblong fruit), VRBG-188-3 (high yield and cylindrical fruit), VRBG-4-1 (sponge gourd type fruit)
Cucumber	Rahuri (35)	RHRCUC-29: 50% flowering and attractive colour; RHRCUC-3: Dark Green; RHRCUC-1:Light green fruited
Pointed gourd	RAU, Pusa	Yield: RPGS 5 (4.43 kg/plant)
Ridge gourd	IIVR (10)	Yield (q/ha): VRRG – 26 (100.9)
	IIHR (20)	High yield: IIHR-92 (101.51 q/ha)
	Rahuri (12)	RHRRG-7: earliness (44.5 days), RHRRG-5: fruit weight (104.1 g)
Ivy gourd	IIVR (7)	Yield: VRIG-4 (8.28 kg/plant)
Muskmelon	Rahuri (4)	RHRMM-44: (475.66q/h), TSS: 9.4ºB
		Downy mildew incidence: RHRMM-44 (8.83%)
		Fruit fly infestation: RHRMM-44 (3.25%)
Pumpkin	Vellanikkara (12)	VKP-2 (fruits per plant-4.5, Fruit weight-2.75 kg, fruit girth-65.4cm, flesh thickness-2.5 cm, golden yellow pulp colour
Cho-cho	ICAR-Barapani (40)	Mizoram-1 (fruits per plant-38, branches-4.0, Fruit weight-600g, fruit length-13.2cm, yield/plant-22.8kg)
Tomato	RAU, Pusa (24)	Yield/plant (kg): RT-2 (1.82)
	Ludhiana (3)	LT-44: Yield (245q/acre) and TSS (5%)
Capsicum	Katrain (3)	Yield (q/ha): EC772769
	Solan (6)	Yield (q/ha): SOLCAP-106
Paprika	Katrain (2)	Marketable yield (q/ha): EC772760 (155.6)
	IIVR (10)	KSxKTPL-19: pendent fruit, long (13 cm), width (1.9 cm), 25 fruits/ plant
Pea	IIVR (25)	CHP-2 (Days to 50% flowering-41, branches/plant-3, pod length-8.8cm, pods/plant-20.2, pod weight-20.2g, seeds/pod-6.9, pod yield/plant-122g)
French bean	Barapani (17 pole and 5 bush type)	RCFB-43: Yield/plant-304.55g, pod weight-14.7g RCFB-62: No of pods/plant (78.6)
Lablab bean	Raipur (135)	Green pod Yield (q/ha): IS-38 (99.13) Days to 1st pod harvest: IS-11 (61.2) Pod length: IS-33 (11.3cm)
Okra	Rahuri (205)	YVMD: RHROK-1 (8.5%)

Crops	Centre (Accessions)	Notable/Promising germplasm
	IIHR (37)	IC0282232: highest fruit yield (1062.5 g/plot)
	Pantnagar (106)	OELCD: IC128079-X (PDI 32%)
Cauliflower Mid	Sabour (16)	IIVR 72: white curd, net curd weight-650g IIVR 60: Creamy white curd, net curd weight-710g
Spine gourd and sweet gourd *(Momordica dioica*)	Kalyani (18)	No. of fruits/plant: BCTG-1 (46) Yield/plant (kg):BCTH-1 (3.91) Ascorbic acid (mg/100 g): BCTG-5 (25.08) ß-carotene in fruit (mg/100g): BCTG-3 (1.4)
	Barapani (15)	No of fruits/plant: RCSG-15 (47.5) Yield/plant: RCSG-22 (3.6kg)
Drumstick	Vellanikkara (14)	Leaf: VKMo 15 (72.9ppm K), VKMo 37 (96.1ppm Ca), VKMo 13 (9.11ppm Fe)
Leafy vegetables (other than amaranth)	CHES, Bhubaneswar (16)	*Talinum portulacifolium, Leucas aspera, Boerhavia diffusa, Emilia sonchifolia, Aerva lanata, Rivea hypocrateriformis, Paederia foetida, Andrographis paniculata, Alternanthera sessilis, Glinus oppositifolius, Portulaca oleracea, Ipomoea aquatica, Marsilea polycarpa, Chenopodium album, Centella asiatica and Commelina benghalensis.*

List of promising germplasm available with different centres (2017-18)

Crops	Centre (Accessions)	Notable/Promising germplasm
Amaranth	Hyderabad (9)	Yield /plant (kg) and reddish green leaf: ST-10 (0.69) Yield /plant (kg) and green leaf: ST-2 (0.6)
	Coimbatore (94)	Yield (q/ha) and red leaf: A-193 (205.0), Height (cm): A-178 (176.8)
Cucumber	IIHR (15)	USM-244: Fruit weight (800g), Bitter free, uniform, tolerant to DM
	Dapoli (18)	Konkan Kakdi : Powdery mildew (7.2%) and Fruit borer (2.63%).
	Nagaland (18)	SRDC-16-9: Days to first flowering (36), SRDC-3-16: Yield/plant (2.3kg)
Ivy gourd	Raipur (32)	Yield/plant (kg): Acc.5 (37.84), Earliness: Acc.09 (34.23 days for first harvest)
Muskmelon	IIHR (10)	Fruit weight (kg): IIHR-796 (3.5), TSS (%): IIHR-784 (7.1)
Tomato	IIHR (7)	ToLCV (Highly resistant): LA 0397, LA 1243, LA 1963
	IIVR (10)	Cherry tomato: VRTCH-1, VRTCH-2, VRTCH-3, VRTCH-4; Betacarotene rich: VRTKB-5, VRTKB-8, VRTKB-9, VRTKB-10, VRTKB-12, VRTKB-14
Brinjal	Raipur (106)	Fruit yield (t ha^{-1}): IGB-6 (42.50); Earliness: IGB-71 (47.87 days for first harvest)
	IIHR (7)	Yield/plant (kg): IIHR-671 (1.50)

Crops	Centre (Accessions)	Notable/Promising germplasm
Paprika	IIHR (7)	Yield/plant (g): Golar Local (750.0)
Pea	Pantnagar (18)	Green pod yield (q/ha): PM 95 (105.8), TSS value (ºBrix): PM 84 (15.9)
French bean	Rahuri (3)	Green pod yield/plant (g): RHRFB-48 (95.04)
	IIVR (25)	Pod yield (q/ha): IIHR-278 (160)
Lablab bean	Raipur (99)	Green pod yield (q/ha): IS-11 (163.64)
	Tripura (30)	Green pod yield/plant (g): Entry No. 23 (5.5)
Okra	IIVR (531)	Moderately tolerant to YVMD and OELCD EC133336, EC169384, EC305648, IC140914, IC385770, EC169147
	IIHR (8)	Yield (t/ha): IIHR-875 (20.67)
Carrot (Temperate)	Katrain (50)	Root length (cm): KS-20 Yield (q/ha): KS-73 (431.8)
Cauliflower (Early)	RPCAU, Pusa (10)	Curd Yield (g): RECF-4 (666.6)
Cauliflower (Mid)	RPCAU, Pusa (10)	Curd Yield (g): RMCF-3 (653.0)
Cauliflower (Late)	Katrain (5)	Curd Yield (q/ha): Kt-27 (478.1)
Cabbage	Katrain (15)	Head weight (Kg): EC173030 (1.76)
Cowpea	Raipur (38)	Green pod yield/ plant (g): ICP-39 (169.7)
	RPCAU, Pusa (27)	Yield (q/ha): EC 390268 (202.9)
	IIHR (25)	Pod yield (q/ha): IIHR-48 (240.0)
Spine gourd and sweet gourd *(Momordica dioica*)	Bhubaneswar (5)	Yield/plant (kg): BSG-2 (1.3)
Drumstick	Periyakulam (63)	High yield (kg/tree): MO-23 (30)
Leafy vegetables (other than amaranth)	CARI (16)	10 genotypes of *Basella alba & B. rubra,* 6 genotypes of Nali Bhaji *(Ipomea aquatic),* 6 genotypes Khatta Bhaji *(Hibiscus sabdariffa),* 5 genotypes of Broad Dhania *(Eryngium foetidum* L.*),* 7 genotypes of Madrasi Bhaji *(Alternanthera philoxeroides),* and 8 genotypes of Medak bhaji *(Centella asiatica).* Poi: High yield: AP-9 (61.54 t/ha); Nali bhaji : ANB-3 (21.89 t/ha), Broad dhania : AD-3 (15.20 t/ha). Medak bhaji: Leaf length (cm): ANC-2 (1.88)

Annexure II

Table 1: Technical programme for germplasm multiplication and characterization (2018-19)

Sl. No.	Crops	No. of Centers	Name of allotted centers
1.	Amaranth	4	Coimbatore, Vellanikkara, Hyderabad, IIVR
2.	Ash gourd	1	Vellanikkara
3.	Bitter gourd	4	IIVR, IARI, Vellanikkara, Rahuri
4.	Bottle gourd	3	IIVR, Rahuri, IIHR
5.	Cucumber	7	IIVR, IARI, Rahuri, Dapoli, Pantnagar, IIHR, Nagaland
6.	Pointed gourd	3	IIVR, RPCAU, Pusa, BAU Sabour
7.	Ridge gourd	3	IIVR, Rahuri, IIHR
8.	Sponge gourd	1	Nagaland
9.	Ivy gourd	3	IIVR, Vellanikkara, IGKV- Raipur
10.	Muskmelon	3	IIVR, Rahuri, IIHR
11.	Pumpkin	4	IIVR, IARI, Vellanikkara, Nagaland
12.	Watermelon	2	Durgapura, IIHR
13.	Chow-chow	1	ICAR Res. Complex Barapani
14.	Tomato	5	IIVR, IARI, Ludhiana, IIHR, RPCAU, Pusa
15.	Brinjal	5	IIVR, NBPGR, IIHR, Raipur, RPCAU, Pusa
16.	Chillies	7	IIVR, IARI, Lam, IIHR, CITH, SKUAST (K), CAU (Pasighat)
17.	Capsicum	5	Katrain, Solan, SKUAST (K), CITH, IIHR
18.	Paprika	3	IIHR, CITH, Dharwad
19.	Pea	3	IIVR, Ludhiana, Pantnagar, Palampur
20.	French bean	5	IIVR, Rahuri, ICAR Res. Complex Barapani, IIHR, Nagaland
21.	Lablab bean	3	IIVR, Raipur, ICAR- Tripura
22.	Okra	4	IIVR, NBPGR, Rahuri, IIHR, Navsari
23.	Carrot temperate	4	Katrain, SKUAS&T (K), Solan
24.	Cauliflower		
	i. Early season	2	IIVR, RAU Pusa, IARI
	ii. Mid season	3	IARI, Sabour, RPCAU, Pusa
	iii. Late season	2	Solan, Katrain
25.	Cabbage	3	Solan, Katrain, Palampur
26.	Cowpea	4	IIVR, IIHR, Raipur, RPCAU, Pusa
27.	Spine gourd and sweet gourd	5	ICAR Res. Complex- Barapani, Tripura, Kalyani, Bhubaneswar, CITH (Mukteshwar)
28.	Drumstick	3	IIHR, Periyakulum, Vellanikkara
29.	Leafy vegetables except amaranth	4	CARI, CHES- Bhubaneswar, CITH, Nagaland
	Total	**109**	

National Exploration plan of ICAR-NBPGR for 2018-19

SN	Crop/species	Areas	Period	Team leader & Associate	Collaborator (s)
1.	Cucurbits (cultivated and wild relatives)	Bihar: Bhabua, Rohtas, Buxar and Aurangabad districts	Oct.-2018	SK Yadav, NS Panwar, NBPGR, HQs, New Delhi	IIVR, Varanasi (K K Gautam)
2.	Primitive type maize, cowpea, yard long bean, lima bean, *Cucumis spp.* And wild leafy vegetables	Mizoram: Phura, Khopal, Chapi, Lungpuk, Balisora, Chamdur, Vathuampui, Devasora and Parva in South districts bordering Bangladesh and Myanmar	Sept.-Oct., 2018	DP Semwal, & OP Dhariwal, NBPGR, HQs, New Delhi, GD Harish, NBPGR, HQs, New Delhi	ICAR-NEH, RC, Kolasib, Mizoram; IIVR, Varanasi (P Karmakar), IIHR, Bengaluru (Dr T S Aghora)
3.	*Sesamum mulayanum*, *Abelmoschus spp.*, *Solanum spp. Luffa sp. Lagenaria & Momordica spp.*	Madhya Pradesh: Bundelkhand region (Datia, Tikamgarh & Chhatarpur) and Uttar Pradesh (Jhansi)	Sept. - Oct., 2018	SP Ahlawat, NBPGR, HQs, New Delhi	IIOR, Hyderabad; IIVR
4.	CWR: Wild species of *Abelmoschus* (particularly *A. tuberculatus*)	Uttar Pradesh: Meerut, Saharanpur, Muzaffarnagar and Bijnor	Oct.-Nov., 2018	Anjula Pandey & NS Panwar, NBPGR, HQs, New Delhi	M Pitchaimuthu, IIHR Bengaluru / Vidya Sagar, IIVR, Varanasi
5.	Vegetables: Brinjal, chillies, cucurbits, beans incl. winged bean and cowpea	Tripura: Hilly tracts of Dhalai, Gomati and South Tripura districts bordering Bangladesh	Oct., 2018	Vinod K Sharma & Vijay Singh Meena (GED) NBPGR, HQs, New Delhi	S K Tiwari, IIVR, Varanasi; HRS, Lam
6.	Cucurbits (cultivated & wild) and landraces of moth-bean	Gujarat: Morbi, Surendranagar, Jamnagar	Sept.-Oct., 2018	DP Semwal, S. Nivedhitha NBPGR, HQs, New Delhi	D R Bhardwaj, IIVR, Varanasi / SDAU, Sardar-Krushinagar
7.	*Vigna*, cucurbits, *Cucumis* and their wild spp., and chilli	Madhya Pradesh: Sarani, Damua, Parasia, Delakhari,	October, 2018	Dinesh Chand, NBPGR-RS,	PKVV, Akola/JNKVV, Jabalpur; HRS,

	and maize	Kararkheda, Kardhar, Patalkot and villages in satpura NP		Akola, DP Wankhede, DGR NBPGR, HQs, New Delhi	Lam; Ajaz Malik, SKUAST-K
8.	Vegetables, legumes and their wild relatives	Maharashtra: Sindhudurg and Uttar Kannara (KN)	October, 2018	Sunil Gomashe, NBPG-RS, Akola & Kuldeep Tripathi, NBPGR, HQs, New Delhi	ICAR-RC-Goa/BSKV, ARS, Sindhdurg
9.	Landraces of pearlmillet, cucurbits (cult./wild) and capsicum	Maharastra: Ahmednagar, Dhule, Aurangabad	Sept. - Oct. 2018	Dinesh Chand, ICAR-NBPGR, RS, Akola	Indian Institute of Millets Research, Hyderabad, IIHR - Bengaluru (Dr. Samramika)
10.	Legumes (*Vigna* spp.), cucurbits, *Abelmoschus* spp., incl. their wild relatives , sesame & sorghum	Chattishagrh : Sukma, Konta (Odisha): Malkangiri	Oct.- Nov., 2018	RC Mishra, NBPGR, RS, Cuttack	IIPR, Kanpur & IIVR, Varanasi (Dr. P. Karmakar) , IIHR- (Dr. B. R. Raghu)
11.	Landraces of maize and cucurbits	Chattisgarh: Bijapur and Sukma districts of Chhattisgarh; & Telangana: East of godavari river in Khammam,	October, 2018	S. Pandravada, NBPGR, RS, Hyderabad	ANGARU, Hyderabad; DMR, Ludhiana
12.	CWR: *Sorghum purpureosericeum* and *S. nitidum, Abelmoschus spp., Corchorus spp.*	Maharastra: Nanded & Hingoli Telangana: Medak and Nizamabad	Sept.- Oct. 2018	V. Kamala, ICAR, NBPGR, RS, Hydrabad	IIMR, Hydrabad & CRUAF, Kolkata
13.	Landraces of chilli (yellow), *Cajanus cajanifolius*	Andhra Pradesh: East Godavari and Vishakhapatnam	Jan. - Feb. 2019	S. Pandravada, NBPGR-RS-Hydrabad, HRS, Lam	DR YSRHU, A.P./IIHR, Bangalore (Dr. K. M. Reddy)
14.	*Vigna*, cucurbits, minor millets and drought tolerant	Rajasthan: Barmer, Jalore	Oct. - Nov., 2018	Neelam Sekhawat, NBPGR-RS-	CICR, Nagpur

	cultivars of *Gossypium arboreum*	Gujrat: Himmatnagar and bordering area of Banaskantha		Jodhpur & S Nivedhitha, NBPGR, HQs, New Delhi	
15.	Cucurbits including bitter gourd (local types)	Bihar: Gaya, Jamui, and Banka	Oct., 2018	SK Bishnoi, NBPGR, RS, Ranchi	IIVR, Varanasi (Dr. D.R. Bhardwaj)
16.	Horse-gram, niger and cucurbits (*Luffa, Coccinia, Trichosanthes* , bottle gourd, pumpkin incl. wild relatives)	Madhya Pradesh: Renukut, Singrauli, Rewa, Sidhi, Tala, Jaisinghnagar/Janakpur, and Partap-pur	Dec., 2018	SB Choudhary, NBPGR, RS, Ranchi	ICAR-RCER, RC, Ranchi , IIVR, Varanasi & RPCAU, Pusa
17.	*Vigna* spp (Urd, Mung, cow pea), including wild relatives, Vegetables & their CWR (*Cucumis melo* & other cucurbits i.e., *Momordica dioca, Luffa tuberosa, Momordica charantia var. muricata, M. sahyadrica*), okra, brinjal	Karnataka: Bellary, Raichur, Koppal	Oct.-Nov., 2018	M. Latha, NBPGR-RS-Thrissur	Dr LK Bharati, IIHR, Bangalore /UAHS-Shimoga
18.	CWR: *Cucumis silentvalleyi, Trichosanthes nervifolia, Abelmoschus angulosus var. purpureus, Sesamum prostratum, Momordica sahyadrica*, other RET niche specific CWR	Kerala: Palakkad, Silent Valley National Park	Nov. 2018	Joseph John, NBPGR, RS, Thrissur	KAU, Kerala and M V Dhananjaya, IIHR, Bangalore
19.	Multi-crops: Grain legumes (urd, mung, cowpea) & CWR: wild Vigna, *Luffa tuberosa, Abelmoschus, Sesamum* spp.)	Karnatka: Bagalkot, Belgaum	Oct. - Nov., 2018	M Abdul Nizar, NBPGR-RS-Thrissur	UAS Dharwad, (KN)/IIPR, Kanpur

CAR-National Bureau of Plant Genetic Resources
Pusa Campus, New Delhi-110 012

PASSPORT DATA FORM

Collector's Name and Address:
Collaborating Institute: Name of Scientist(s) and Address:
Area Explored:
Duration of Exploration: From To:

S. N.	Collector No.	IC No.	*Crop's common name*	Botanical name	Vernacular name	Landrace name	Biological status	Type of material	Date of collection	Collecting site/ acquisition source	Frequency
1.											
2.											

S. N.	Collector No.	Sample type	Sampling method	Habitat	Site of collection				Latitude (N)	Longitude (E)	Altitude (m)	Ethnobotanical information / Ethnic group	Remarks (Trait-specific characters)
					Village	Mandal/Taluk/ Tehsil	District	State					
1.													
2.													

The completed sheets for allotting IC number should be sent along with samples (2000/4000 seeds of self/cross pollinated crops) to:

The Head, Division of Plant Exploration and Germplasm Collection, ICAR- National Bureau of Plant Genetic Resources, Pusa Campus, New Delhi-110 012
E mail address: exploration@nbpgr.ernet.in (please also send soft copy of passport data in MS Excel through e mail), Phone: 011-2584 8405 (O)
For issuance of IC number to vegetatively propagated crops/species, also furnish the certificate of conservation/maintenance in field gene bank/NAGs

Useful tips

Collector number: denotes a unique/primary identity assigned by the collector at the time of collection, given in abbreviated form of collectors name followed by accession number (for example: KCB/KP/231 (expanded form is: collector number assigned in an exploration by KC Bhatt as team leader and K Pradheep as collaborator/associate; germplasm sample sequence/ serial number is 231)

Biological status: (Wild-All wild species that are related and part of the genepool from which genetic introgression into cultivated species is possible using conventional methods; Weedy-Weedy form of cultivated species occurring in companionship (fields) of some other cultivated species; Landrace/Traditional/ Primitive cultivars/ Farmers variety- All cultigens under cultivation in farmer's field with/ without specific names frequently associated with unique traits identified by farmers; Breeding line-Semi-finished products or segregating material generated out of hybridization programme to meet specific breeding objectives; Elite line/Advanced/ Improved

cultivar- Selection from population, from coordinated trial (AVT-II line), improved cultigens of common knowledge in commercial cultivation (extent, released by institution/organization/State) but not notified from the Central Sub-Committee on crop standards, Notification and Release of Varieties of Agricultural and Horticultural Crops and Parental lines of hybrids; Released cultivar/ Hybrid-Varieties/hybrids notified and released by the Central Sub-Committee on crop standards, Notification and Release of Varieties of Agricultural and Horticultural Crops; Genetic stock/ Registered germplasm- Trait and gene specific germplasm experimentally developed/identified through scientific interventions (e.g. sources of resistance, mutant, cytogenetic stock etc.) which is registered for unique trait(s) at ICAR-NBPGR; Others-Doubtful or material with unknown biological status)

Type of material: Seed/fruit/inflorescence/root/underground parts/cuttings/live plants
Collecting site/acquisition source: Farmer's field/ threshing yard/ fallow/ farm store/ wild/ orchard/home garden/ market/ aquatic/Institute name (if others, give source name)

Frequency: Abundant/frequent/occasional/rare;

Sample type: Population/pure line/Individual; Sampling method: Bulk/random/non-random

Habitat: Cultivated/disturbed/partially disturbed/rangeland/forest/aquatic habitat

SESSION-III
Varietal Evaluation

Chairperson	:	Prof. G. Kalloo, Ex. Vice Chancellor, JNKVV, Jabalpur
Co-Chairperson	:	Dr. A.S. Dhatt, Professor, PAU
Convener	:	Dr. B.K. Singh, Scientist, ICAR-IIVR, Varanasi
Rapporteurs	:	Dr. T.K. Behera, Principal Scientist, ICAR-IARI, New Delhi
		Dr. P. Karmakar, ICAR-IIVR, Varanasi

Chairperson Prof G Kalloo welcomed the delegates with opening remarks emphasizing the importance of improved varieties in vegetable crop production to increase the productivity. He also stressed upon the importance of vegetable quality and disease reaction parameters as ancillary observations apart from yield of the varieties during multi-locational testing. After the introductory remarks, the Chairperson invited Dr Nagendra Rai, Principal Scientist, IIVR, Varanasi to present the progress of varietal trials pertaining to tomato and brinjal, Dr Arup Chattopadhyay, Professor, BCKV, Kalyani presented the data on chilli, *Capsicum*, leafy, cole crops and root crops and Dr T S Aghora, Principal Scientist, ICAR-IIHR, Bengaluru on leguminous and cucurbitaceous vegetables. Progress reports of 2016-17 and 2017-18 of the respective crops were discussed thoroughly and the following recommendations emerged.

Suggestions:

1. Trial related to vegetable pea should not be allotted to Port Blair Centre.
2. It was suggested to adhere to record the observations as per the AICRP (VC) proceedings following proper methodology and at right stage of the crop.
3. Ancillary data need to be collected as per the data sheets/ guidelines provided by the Coordinator.
4. It should be made mandatory to use standard check varieties in all trials.
5. Timely monitoring of the trials through monitoring team should be undertaken.

Recommendations

6. Trials should be conducted by the centre in suitable season following recommended package of practices.
7. In case of brinjal trials, the centre where the bacterial wilt is a severe problem, only bacterial wilt resistant trial should be allotted instead of varietal trial.
8. The centre reporting low yield/poor performance of the trials must be justified for the cause of failure/poor yield to PC cell.
9. Breeders should ensure to supply pure seeds of the entries for evaluation trials.

TECHNICAL PROGRAMME (2018-19)

A. IET Trials

1. Brinjal (Long) IET

Sl. No.	Entry	Year	Source	Centres
1.	DIBER BL-1	2018	DIBER, Pithoragarh	**I:** Srinagar (SKU), Srinagar (CITH), Pantnagar, Pithoragarh **II:** Kalyani, Cooch Behar **III:** Barapani, Portblair **IV:** Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur, Faizabad **V:** Raipur, Hyderabad **VI:** Junagadh, IARI, Anand **VII:** Jabalpur, Parbhani, Goa **VIII:** Coimbatore, Vellanikkara, IIHR
2.	BCB-42	2018	BCKV, Kalyani	
3.	KAU-FSRS-Sm-1	2018	KAU, Vellanikkara	
4.	PBL-712	2018	PAU, Ludhiana	
5.	PB-113	2018	GBPUA&T, Pantnagar	
6.	PB-114	2018	GBPUA&T, Pantnagar	
7.	DBGL-225-2-5-17	2018	IARI, New Delhi	
8.	IGBKSL-2018-3	2018	IGKV, Raipur	
9.	IVBL-26	2018	IIVR, Varanasi	
10.	Kashi Taru (C)	-	IIVR, Varanasi	
11.	Punjab Sadabhar(C)	-	PAU, Ludhiana	

Seed Quantity : 10 g
Seed supply : 30th May (25+3)
Plot size : 4.5 × 4.2 m
Spacing : 75 × 60 cm
Total centres : 25
Design : RBD
Replications : 3

2. Tomato (Determinate) IET

Sl. No.	Entry	Year	Source	Centres
1.	BT 2017-1	2018	OUAT, Bhubaneswar	**I:** Srinagar (SKU), Pantnagar, Almora, Pithoragarh, Srinagar (CITH) **III:** Barapani, Portblair **IV:** Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur **V:**Raipur, Bhubaneshwar (OUAT), Hyderabad **VI:** IARI, Junagadh, Hisar, Anand, Navsari **VII:** Parbhani, Rahuri, Jabalpur **VIII:** IIHR, Coimbatore, Bagalkot (UHS)
2.	ATL 17-06	2018	AAU, Anand	
3.	VRT-34	2018	IIVR, Varanasi	
4.	VRT-18-01	2018	IIVR, Varanasi	
5.	NTL-12-07	2018	NAU, Navasari	
6.	Kashi Aman(C)	-	IIVR, Varanasi	
7.	Punjab Ratta (C)	-	PAU, Ludhiana	

Seed Quantity : 10 g
Seed supply : 30th May (26+3)
Plot size : 4.8 × 4.0 m
Spacing : 60 × 50 cm
Total centres : 26
Design : RBD
Replications : 4

3. Cherry Tomato IET

Sl. No.	Entry	Year	Source	Centres
1.	Phule Jayshree	2018	MPKV, Rahuri	**I:** Srinagar (SKU), Pantnagar, Almora, Pithoragarh, Srinagar (CITH), Palampur **II:** Kalyani, Jorhat **III:** Barapani, Portblair **IV:** Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur **V:**Raipur, Hyderabad
2.	DPCTY-1	2018	CSK HPKV, Palampur	
3.	IIHR -2858	2018	IIHR, Bengaluru	
4.	IIHR -2862	2018	IIHR, Bengaluru	
5.	Pusa Cherry Tomato-1(C)	-	IARI, New Delhi	

6.	Swarn Ratan (C)	-	RECNH, Ranchi	**VI:** IARI, Junagadh, Hisar, Anand **VII:** Parbhani, Rahuri, Jabalpur **VIII:** IIHR, Coimbatore, Bagalkot (UHS)

Seed Quantity : 10g
Seed supply : 30th May (27+3)
Plot size : 4.8 × 4.0 m
Spacing : 60 × 50 cm
Total centres : 27
Design : RBD
Replications : 4

4. Tomato (Indeterminate) IET

Sl. No.	Entry	Year	Source	Centres
1.	KS-266	2018	CSAUA&T, Kalyanpur	**I:** Srinagar (SKU), Pantnagar, Almora, Pithoragarh, Srinagar (CITH) , Solan, Palampur **III:** Barapani, Portblair, **IV:** Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur **V:**Raipur, Bhubaneshwar (OUAT), Hyderabad **VI:** Junagadh, Hisar, IARI, Navsari **VII:** Parbhani, Rahuri, Jabalpur **VIII:** IIHR, Coimbatore, Bagalkot (UHS), Dharwad (UAS)
2.	Punjab Swarna	2018	PAU, Ludhiana	
3.	VRT-50	2018	IIVR,Varanasi	
4.	DPT-1	2018	Palampur	
5.	DPT-2	2018	Palampur	
6.	VRT-51	2018	IIVR,Varanasi	
7.	NTL-12-01	2018	NAU, Navasari	
8.	Arka Vikash (C)	-	IIHR, Bengaluru	

Seed Quantity : 10g
Seed supply : 30th May(28+3)
Plot size : 4.8 × 4.0 m
Spacing : 60 × 50 cm
Total centres : 28
Design : RBD
Replications : 4

5. Chilli /Hot Pepper IET

Sl. No.	Entry	Year	Source	Centres
1.	CITH-HP-111-1	2018	CITH, Srinagar	**I:** Srinagar (SKU), Pantnagar, Srinagar (CITH), Palampur, **II:** Jorhat, Kalyani, Cooch Bihar **IV:** Ludhiana, IIVR, Ranchi **V**:Raipur, Bhubaneshwar (OUAT), Lam **VI:** IARI, Hisar, Durgapura **VII:** Parbhani, Rahuri, Jabalpur, Goa **VIII:**IIHR, , Coimbatore, Bagalkot (UHS),
2.	VRC-14	2018	IIVR, Varanasi	
3.	VRC-16	2018	IIVR, Varanasi	
4.	BC-14-2	-	Bhubaneshwar (OUAT)	
5.	Kashi Anmol (C)	-	IIVR,Varanasi	
6.	LCA-334(C)	-	CCS HRS,Lam	

Seed quantity : 50g
Seed supply : 30th May (23+3 pkt)
Plot size : 4.2 × 3.5 m
Spacing : 60 × 50 cm
Total Centres : 23
Design : RBD
Replication : 3

6. Capsicum IET

Sl. No.	Entry	Year	Source	Centres
1.	DIBER -75	2018	DIBER, Pithoragarh	**I:** Srinagar (SKAUST), Solan, Srinagar (CITH), Palampur, VPKAS, Pithoragarh **II:** Jorhat, Kalyani, Cooch Bihar **IV:** Ludhiana, IIVR, Ranchi **V**:Bhubaneshwar (OUAT)
2.	SH-SPH-7	2018	SKAUST, Srinagar	
3.	CITH-SP-4	2018	CITH, Srinagar	
4.	PAUSAM-3	2018	PAU, Ludhiana	
5.	Pusa Deepti (C)	-	IARI, New Delhi	

6.	Nishant –I(C)	-	SKUAS&T, Srinagar	**VI:** IARI, Hisar, Anand **VII:** Parbhani, Rahuri, Jabalpur **VIII:**IIHR, Coimbatore, Bagalkot (UHS),

Seed Quantity : 10g
Seed supply : 30th May (22+3)
Plot size : 4.8 × 4.0 m
Spacing : 60 × 50 cm
Total centres : 22
Design : RBD
Replications : 4

7. Cabbage IET

Sl. No.	Entry	Year	Source	Conducting centres
1.	KTCB-52	2018	IARI (RS), Katrain	**I :** Palampur, Solan, Srinagar (SKU), IARI (Katrain), Pithoragarh **III:** Barapani, Pashighat **IV:** IIVR, Ludhiana **VI** IARI, Durgapura **VII:** Jabalpur **VIII:** Coimbatore, Periyakulum
2.	KTCB-121	2018	IARI (RS), Katrain	
3.	KGAT-1	2018	CSKHPKV, Palampur	
4.	DPC-1	2018	CSKHPKV, Palampur	
5.	PA-2	2018	IARI, New Delhi	
6.	KGMR-1(C)	-	IARI, Katrain	
7.	Quisto (C)	-	Syngenta Seeds	

Seed quantity : 5g
Seed supply : 30th May (14+3 pkt)
Plot size : 4.2 x 3.5m
Spacing : 60 x 50 cm
Total Centres : 14
Design : RBD
Replication : 3

8. Cauliflower (Mid) IET

Sl. No.	Entry	Year	Source	Centres
1.	KTCF-4	2018	IARI (RS), Katrian	**I :** Palampur, Solan, Srinagar, IARI (Katrain), Pithoragarh **III:** Barapani, Passighat **IV:** IIVR, Ludhiana, Sabour **VI** IARI, Durgapura **VII:** Jabalpur, Rahuri
2.	KTCF-2	2018	IARI (RS), Katrian	
3.	VRCF-104	2018	IIVR,Varanasi	
4.	VRCF-202	2018	IIVR, Varanasi	
5.	DCML-453	2018	IARI, New Delhi	
6.	DCML-411	2018	IARI, New Delhi	
7.	Pusa Sharad(C)	-	IARI, New Delhi	

Seed quantity : 10g
Seed supply : 30th June (14+3 pkt)
Plot size : 3.00 × 2.0 m
Spacing : 60 × 50 cm Sowing Time: Zone I: March/ April; Other Zones: July/August
Total Centres : 14
Design : RBD
Replication : 3

9. Lettuce Varietal - IET

Sl. No.	Entry	Year	Source	Centres
1.	DL Sel-36	2018	IARI, New Delhi	**I :** Palampur, Solan, Srinagar (SKU), IARI (Katrain), Pithoragarh **III:** Barapani, Passighat **IV:** IIVR, Ludhiana **VI** IARI, Durgapura **VII:** Jabalpur
2.	DL Sel-13	2018	IARI, New Delhi	
3.	SOL-LET-1	2018	YSPUH&F, Solan	
4.	SOL-LET-2	2018	YSPUH&F, Solan	
5.	Great lakes(C)	-	IARI, Katrain	
6.	Chinease Yellow(C)	-	IARI, Katrain	

Seed quantity : 10g
Seed supply : 30th Oct. (12+3 pkt)
Plot size : 4.0 × 3.0 m
Spacing : 40× 30 cm
Total Centres : 12
Design : RBD
Replication : 4

10. Dolichos bean (Bush) IET

Sl. No.	Entry	Year	Source	Centres
1.	VRB Sem-207	2018	IIVR,Varanasi	**I:** Srinagar (SKU), Pantnagar **IV:** Ludhiana, IIVR, Ranchi, Kalyanpur **V:** Bhubaneshwar (OUAT), Raipur, Lam **VI:** IARI, Hisar, Durgapura, Karnal (NHRDF), Navsari **VII:** Jabalpur, Rahuri, Parbhani **VIII:** Bagalkot (UHS), IIHR, UAS-Bengaluru, Vellanikkara
2.	VRB Sem-08	2018	IIVR,Varanasi	
3.	GNIB-22	2018	NAU, Navsari	
4.	HA-5	2018	UAS, Bengaluru	
5.	Arka Jay (C)	2018	IIHR, Bengaluru	
6.	Konkan Bhushan (C)	-		

Seed Quantity : 150g
Seed supply : 20th May (21+3 pkt)
Plot size : 3.6 × 3.0 m
Spacing : 45 ×30 cm
Total centres : 21
Design : RBD
Replications : 4

11.Dolichos bean (Pole) IET

Sl. No.	Entry	Year	Source	Centres
1.	Arka Krishna	2018	IIHR, Bengaluru	**I:** Srinagar (SKU), Pantnagar **IV:** Ludhiana, IIVR, Ranchi, Kalyanpur **V:** Bhubaneshwar (OUAT), Raipur, Lam **VI:** Hisar, Durgapura, Junagadh, IARI **VII:** Jabalpur, Rahuri, Parbhani **VIII:** Bagalkot (UHS), IIHR, Vellanikkara
2.	Arka Pradhan	2018	IIHR, Bengaluru	
3.	DB-23	2018	IARI, New Delhi	
4.	RHRDBP-04	2018	MPKV, Rahuri	
5.	RHRDBP-05	2018	MPKV, Rahuri	
6.	GJIB-15-03	2018	JAU, Junagadh	
7.	GJIB-15-04	2018	JAU, Junagadh	
8.	Kashi Haritma (C)	-	IIVR,Varanasi	
9.	Swarn Utkristi (C)	-	RECNH, Ranchi	

Seed Quantity : 150g
Seed supply : 20th May (19+3 pkt)
Plot size : 4.5 × 3.0 m
Spacing : 150 ×75 cm
Total centres : 19
Design : RBD
Replications : 3

12.Garden Pea (Early) IET

Sl. No.	Entry	Year	Source	Centres
1.	KS-683	2018	CSAUA&T, Kalyanpur	**I:** Solan, Almora, Palampur, Pithoragarh, Ranichauri, CITH Mukteshwar **III:** Nagaland, Passighat **IV:** IIVR, Ludhiana, Kalyanpur, Ranchi **VI:** IARI, Hisar, Durgapura **VII:** Jabalur, Rahuri, Parbhani **VIII:** IIHR, Bagalkot (UHS)
2.	GP- 1102	2018	IARI, New Delhi	
3.	VP- 1423	2018	VPKAS, Almora	
4.	VP- 1513	2018	VPKAS, Almora	
5.	Matar Ageta7 (C)	-	PAU, Ludhiana	
6.	AP-3(C)	-	CSAUA&T, Kalyanpur	
7.	VRP-6(C)	-	IIVR,Varanasi	

Seed Quantity : 300g
Seed supply : 30th June (20+3 pkt)
Plot size : 3.0 × 3.0 m
Spacing : 30 × 10 cm
Total centres : 20
Design : RBD
Replications : 3

13.Garden Pea (Mid) IET

Sl. No.	Entry	Year	Source	Centres
1.	VP -1218	2018	VPKAS, Almora	**I:** Solan, Almora, Palampur, Pithoragarh, Ranichauri, CITH Mukteshwar **III:** Nagaland, Passighat **IV:** IIVR, Ludhiana, Kalyanpur, Ranchi **VI:** IARI, Hisar, Durgapura **VII:** Jabalur, Rahuri, Parbhani **VIII:** IIHR, Bagalkot (UHS)
2.	VP-1242	2018	VPKAS, Almora	
3.	Punjab-90	2018	PAU, Ludhiana	
4.	VRPM-903	2018	IIVR,Varanasi	
5.	DPP-SP-6	2018	CSK HPKV, Palampur	
6.	VRP-7 (C)	-	IIVR,Varanasi	
7.	PC-531 (C)	-	PAU, Ludhiana	
8.	AP-1 (C)	-	CSAUA&T, Kalyanpur	

Seed Quantity : 300 g
Seed supply : 30th June (20+3 pkt)
Plot size : 3.0 × 3.0 m,
Spacing : 30 × 10 cm
Total centres : 20
Design : RBD
Replications : 3

14. Pea (Edible Pod) IET

Sl. No.	Entry	Year	Source	Centres
1.	VPSP-1301	2018	VPKAS, Almora	**I:** Solan, Almora, Palampur, Pithoragarh, Ranichauri, CITH Mukteshwar **III:** Nagaland, Passighat, **IV:** IIVR, Ludhiana, Faizabad, Kalyanpur, Ranchi **VI:** IARI, Hisar, Durgapura **VII:** Jabalur, Rahuri, Parbhani **VIII:** IIHR, Bagalkot (UHS)
2.	VPSP-906-1	2018	VPKAS, Almora	
3.	DPEPP-15-1	2018	CSK HPKV, Palampur	
4.	DPEPP-10-1	2018	CSK HPKV, Palampur	
5.	Arka Apoorva	2018	IIHR, Bengaluru	
6.	VRP-6 (C)	-	IIVR,Varanasi	
7.	VL -Ageti Matar (C)	-	VPKAS, Almora	
8.	Arka Sampurna (C)	-	IIHR, Bengaluru	

Seed Quantity : 300 g
Seed supply : 30th June (21+3 pkt)
Plot size : 3.0 × 3.0 m,
Spacing : 30 × 10 cm
Total centres : 21
Design : RBD
Replications : 3

15. Bitter gourd IET

Sl. No.	Entry	Year	Source	Centres
1.	BBG 17-1	2018	OUAT, Bhubaneswar	**I :** Pantnagar, Pithoragarh **III:** Nagaland, Barapani **IV:** IIVR, Ludhiana, Allahabad, Ranchi **V:** Bhubaneshwar (OUAT) **VI**: IARI, Hisar, Rahuri **VIII:** Coimbatore
2.	HK-127	2018	CCSHAU, Hisar	
3.	VRBTG-5	2018	IIVR,Varanasi	
4.	VRBTG-10	2018	IIVR,Varanasi	
5.	Arka Harit (C)	-	IIHR, Bengaluru	
6.	NBGH-167 (C)	-	NDAUT& Faizabad	
7.	Kalyanpur Sona (C)	-	CSAUA&T, Kalyanpur	

Seed quantity : 100 g
Seed supply : 30th Oct. (13+3 pkt)
Plot size : 7.5 × 3.0 m
Spacing : 150 × 75 cm
Total Centres : 13
Design : RBD
Replication : 4

16. Bottle gourd IET

Sl. No.	Entries	Year	Source	Centres
1.	NDBG-21	2018	NDUA&T, Faizabad	**I:** Srinagar (SKU), Pantnagar, Pithoragarh, Jammu **III:** Barapani, Portblair **IV:** Ranchi, Ludhiana, IIVR, Sabour, Faizabad, Kalyanpur, Allahabad, **V:** Raipur, Bhubaneshwar (OUAT), Hyderabad **VI:** IARI, Junagadh, Navsari **VII:** Rahuri, Chitrakoot, Jabalpur, Parbhani **VIII:** Coimbatore, Bagalkot (UHS), IIHR, Karaikal
2.	NDBG-22	2018	NDUA&T, Faizabad	
3.	VRBG-2-1	2018	IIVR, Varanasi	
4.	VRBG-4	2018	IIVR, Varanasi	
5.	Kashi Ganga (C)	-	IIVR, Varanasi	
6.	Arka Bahar (C)	-	IIHR, Bengluru	
7.	Pusa Navin (C)	-	IARI, New Delhi	

Seed quantity : 50g
Seed supply : 30th Oct. (27+3 pkt)
Plot size : 7.5 × 3.0 m
Spacing : 300 × 75 cm
Total Centres : 27
Design : RBD
Replication : 4

17. Sponge gourd-IET

Sl. No.	Entry	Year	Source	Centres
1.	VRSG-17-3	2018	IIVR, Varanasi	**IV:** Ludhiana, IIVR, Sabour, Kalyanpur, Ranchi, Allahabad **V:** Bhubaneswar (OUAT), Hyderabad, Raipur **VI:** IARI, Junagadh, Anand, Durgapura, CIAH **VIII:** Coimbatore, Karaikal
2.	VRSG-57	2018	IIVR, Varanasi	
3.	AHSG/2015/F5/01	2018	CIAH, Bikaner	
4.	DSG-33	2018	IARI, New Delhi	
5.	Pusa Supriya (C)		IARI, New Delhi	
6.	Kashi Divya (C)		IIVR, Varanasi	
7.	Kashi Shreya (C)/ VRSG-194		IIVR, Varanasi	

Seed quantity : 100g
Seed supply : 30th Oct. (16+3 pkt)
Plot size : 7.5 × 3.0 m
Spacing : 150 × 60 cm
Total Centres : 16
Design : RBD
Replication : 4

18. Cucumber IET

Sl. No.	Entry	Year	Source	Centres
1.	Punjab Kheera-1	2018	PAU, Ludhiana	**I:** Solan, Pantnagar, Pithoragarh **III.** Nagaland, Barapani **IV:** Ludhiana, IIVR, Sabour, Kalyanpur, Ranchi, Allahabad **V:** Bhubaneswar (OUAT), Hyderabad **VI:** IARI, Anand, Durgapura, **VIII:** IIHR, Coimbatore, Karikal
2.	BRCU-1	2018	BAU, Sabour	
3.	VRCU-Sel-12-02	2018	IIVR,Varanasi	
4.	VRCU-Sel-13-19	2018	IIVR Varanasi	
5.	Pant Kheera 1 (C)	-	GBPAU&T Pantnagar	
6.	Pusa Sanyog (C)	-	IARI, New Delhi	

Seed quantity : 50g
Seed supply : 30th October (19+3 pkt)
Plot size : 4.5 × 3.0 m
Spacing : 150 × 50 cm
Total Centres : 19
Design : RBD
Replication : 3

19. Pumpkin IET

Sl. No.	Entry	Year	Source	Centres
1.	NDPK-S-1	2018	NDUA&T, Faizabad	**IV:** Ludhiana, IIVR, Sabour, Kalyanpur, Faizabad, Ranchi **V:** Hyderabad, Raipur, Bhubaneswar (OUAT) **VI:** IARI, Durgapura **VII:** Parbhani, Rahuri, Jabalpur, Akola **VIII:** IIHR, Coimbatore, Karikal
2.	NDPK-S-2	2018	NDUA&T, Faizabad	
3.	VRPK-18-01	2018	IIVR,Varanasi	
4.	VRPK-18-09	2018	IIVR,Varanasi	
5.	Kashi Harit (C)	-	IIVR,Varanasi	
6.	Narendra Agrim (C)	-	NDUA&T, Faizabad	
7.	Pusa Visesh (C)	-	IARI, New Delhi	
		-		

Seed quantity : 100g
Seed supply : 30th Oct. (18+3 pkt)
Plot size : 7.5 x 3.0 m
Spacing : 300 x 60 cm

Total Centres : 18
Design : RBD
Replication : 4

20. Long Melon IET

Sl. No.	Entry	Year	Source	Centres
1.	DLM-27	2018	IARI, New Delhi	**IV:** Ludhiana, IIVR, Sabour, Kalyanpur, Ranchi **V:** Hyderabad, Bhubaneswar (OUAT) **VI:** IARI, Anand, Durgapura, CIAH **VIII:** Coimbatore, IIHR
2.	Thar Sheetal (AHLM-2)	2018	CIAH, Bikaner	
3.	Durga L.M.-28	2018	RARI, Durgapura	
4.	Durga L.M.-1	2018	RARI, Durgapura	
5.	Punjal long –M-1(C)	-	PAU, Ludhiana	
6.	Arka sheetal(C)	-	IIHR, Bengaluru	

Seed quantity : 50g
Seed supply : 30th Oct. (13+3 pkt)
Plot size : 7.5 × 3.0 m
Spsacing : 150 × 75 cm

Total Centres : 13
Design : RBD
Replication : 4

21. Radish IET

Sl. No.	Entry	Year	Source	Centres
1.	DPR-1	2018	CSK HPKV, Palampur	**I :** Palampur, Solan Srinagar, Pithoragarh, CITH Mukteshwar **II:** Kalyani, Cooch Behar, Jorhat **III:** Barapani, Pashighat, Tripura, Nagaland **IV:** IIVR, Ludhiana, Sabour **VI** IARI, Durgapura **VII:** Jabalpur, Rahuri **VIII:** Coimbatore, IIHR
2.	VRRAD-200	2018	IIVR,Varanasi	
3.	VRRAD-203	2018	IIVR,Varanasi	
4.	RL-22	2018	PAU, Ludhiana	
5.	Kashi Shweta (C)	-	IIVR,Varanasi	
6.	Kashi Hans (C)	-	IIVR,Varanasi	
7.	Japani white (C)	-	IARI, New Delhi	

Seed quantity : 10g
Seed supply : 30th May (21+3 pkt)
Plot size : 3.2 × 3.0 m,
Spacing : 40 × 10 cm

Total Centres : 21
Design : RBD
Replications : 4

22. Mustard Green/Laipatta(Brassica juncea) IET

Sl. No.	Entry	Year	Source	Centres
1.	Narendra Dev Sarson Sag-1	2018	NDUA&T, Faizabad	**I :** Palampur, Solan Srinagar, DIBER, CITH Mukteshwar **II:** Kalyani, Cooch Behar, Jorhat **III:** Barapani, Pashighat, Tripura, Nagaland **IV:** IIVR, Ludhiana, Sabour, Faizabad **VI** IARI, Durgapura **VII:** Jabalpur, Rahuri **VIII:** Coimbatore
2.	NUGM-6	2018	SASRD, Nagaland	
3.	NUGM-8	2018	SASRD, Nagaland	
4.	CITH-M-LP-1	2018	CITH Mukteshwar	
5.	CITH-M-LP-2	2018	CITH Mukteshwar	
6.	Pusa sag-1 (C)	-	IARI (RS), Katrain	
7.	UHF VR-12-1 (C)	-	Ranichauri	

Seed quantit : 10g
Seed supply : 30th May (21+3 pkt)
Plot size : 3.2 × 3.0 m,
Spacing : 20 × 10 cm

Total Centres : 21
Design : RBD
Replications : 3

B. AVT-I Trials

Brinjal (Long) AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	IVBL 25	2017	IIVR, Varanasi	**I:** Srinagar (SKU), Srinagar (CITH), Solan, Pantnagar **II:** Kalyani, Cooch Behar, Jorhat **III:** Barapani, Portblair, Nagaland **IV:** Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur, Faizabad **V:**Raipur, Hyderabad **VI:** IARI, Junagadh, Anand, Navsari **VII:** Jabalpur, Parbhani, Goa **VIII:** Coimbatore, IIHR
2.	PB-111	2017	GBPUAT, Pantnagar	
3.	PB-112	2017	GBPUAT, Pantnagar	
4.	NDB White-1	2017	NDUAT, Faizabad	
5.	DBL-60	2017	IARI, New Delhi	
6.	DBL-17	2017	IARI, New Delhi	
7.	PBL-235	2017	PAU, Ludhiana	
8.	Kashi Taru (C)	-	IIVR, Varanasi	
9.	Pb. Sadabahar (C)	-	PAU, Ludhiana	
10.	Local (C)	-		

Seed Quantity : 10 g
Seed supply : 30th May (27+3 pkt)
Plot size : 4.5 × 4.2 m
Spacing : 75 × 60 cm
Total centres : 27
Design : RBD
Replications : 3

2. Brinjal (Round) AVT-I

Sl.No.	Entry	Year	Source	Centres
1.	IVBR-18	2017	IIVR, Varanasi	**I:** Srinagar (SKU), Pantnagar, Srinagar (CITH) **II:** Kalyani, Jorhat **III:** Barapani, Portblair, Nagaland **IV:** Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur **V:** Raipur, Hyderabad, Bhubanewar **VI:** IARI, Junagadh, Hisar, Navsari **VII:** Jabalpur, Parbhani, Rahuri, Goa, Akola **VIII:** Coimbatore, IIHR
2.	DBR-22	2017	IARI, New Delhi	
3.	DBR-181	2017	IARI, New Delhi	
4.	Brinjal Round	2017	PDKV, Akola	
5.	PBR-4225	2017	PAU, Ludhiana	
6.	BBV-1-17	2017	BBSR, OUAT, Bhubaneshwar	
7.	JBR-14-07	2017	JAU, Junagadh	
8.	Pusa Kranti (C)	-	IARI, Varanasi	
9.	KS-224 (C)	-	CSKUA&T, Kalyanpur	
10.	Swarna Mani (C)	-	RCER, Ranchi	
11.	Local (C)	-		

Seed quantity : 10g
Seed supply : 30th May (27+3 pkt)
Plot size : 4 .5 × 4.2 m
Spacing : 75 × 60 cm
Total Centres : 27
Design : RBD
Replication : 3

3. Brinjal Small Round AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	PBSR-9322	2017	PAU, Ludhiana	**I:** Srinagar (SKU), Pantnagar, Almora, Pithoragarh, Srinagar (CITH) **III:** Barapani, Pasighat, Portblair, Nagaland **IV:** Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur **V:**Raipur, Bhubaneshwar (OUAT), Hyderabad **VI:** IARI, Junagadh, Hisar, Anand, Navsari, **VII:** Parbhani, Rahuri, Jabalpur, Akola **VIII:** IIHR, Coimbatore, Bagalkot (UHS), Dharwad (UAS)
2.	AB-15-07	2017	AAU, Anand	
3.	AB-15-08	2017	AAU, Anand	
4.	IVBSR-1	2017	IIVR, Varanasi	
5.	AKB-46	2017	Akola	
6.	Punjab Nageena	2017	PAU, Ludhiana	
7.	Aruna (C)	2017	PDKV, Akola	
8.	Local (C)	-		

Seed quantity	:	10g	Total Centres	:	30
Seed supply	:	30th May (30+3 pkt)	Design	:	RBD
Plot size	:	4 .5 × 4.2 m	Replication	:	4
Spacing	:	75 × 60 cm			

4. Tomato (Determinate) AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	NTL 12-07	2017	NAU, Navsari	**I:** Srinagar (SKU), Pantnagar, Almora, Pithoragarh, Srinagar (CITH) **III:** Barapani, Pasighat, Portblair, Nagaland **IV:** Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur **V:**Raipur, Bhubaneshwar (OUAT), Hyderabad **VI:** IARI, Junagadh, Hisar, Anand, Navsari, **VII:** Parbhani, Rahuri, Jabalpur **VIII:** IIHR, Coimbatore, Bagalkot (UHS), Dharwad (UAS)
2.	VRT-06	2017	IIVR,Varanasi	
3.	VRT-13	2017	IIVR, Varanasi	
4.	PAU-2381	2017	PAU, Ludhiana	
5.	ALT-10-04	2017	RS AAU, Anand	
6.	ALT-16-06	2017	RS AAU, Anand	
7.	JTL-12-02	2017	JAU, Junagadh	
8.	JTL-15-05	2017	JAU, Junagadh	
9.	Kashi Aman (C)	-	IIVR, Varanasi	
10.	Punjab Ratta (C)	-	PAU, Ludhiana	
11.	Local (C)	-		

Seed Quantity	:	10g	Total centres	:	29
Seed supply	:	30th May (29+3 pkt)	Design	:	RBD
Plot size	:	4.8 × 4.0 m	Replications	:	3
Spacing	:	60 × 50 cm			

5. Cauliflower (Mid) AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	KT-37	2017	IARI, Katrain	**I:**Solan, Katrain, Srinagar (SKU), Pantnagar, Palampur **IV:** IIVR, Ludhiana, Sabour, RPCAU-Pusa, Ranchi **VI:** IARI, Junagadh, Hisar, Durgapura **VII:** Jabalpur, Rahuri, Parbhani
2.	DPCaY-7	2017	CSK HPKV, Palampur	
3.	Palam Upahar	2017	CSK HPKV, Palampur	
4.	RMCF-1	2017	DR RPCAU, Pusa, Bihar	
5.	RMCF-5	2017	DR RPCAU, Pusa, Bihar	
6.	VRCF-102	2017	IIVR, Varanasi	
7.	Pusa Sharad (C)	-	IARI, New Delhi	
8.	Kashi Agahani (C)	-	IIVR, Varanasi	
9.	Local (C)	-		

Seed quantity	:	10g	Total Centres	:	17
Seed supply	:	30th June (17+3 pkt)	Design	:	RBD
Plot size	:	3.00 × 2.0 m	Replications	:	4
Spacing	:	60 × 50 cm	Sowing Time: Zone I: March/ April; Other Zones: July/August		

6. French bean (Pole) AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	PFBP-15	2017	GBPUAT, Pantnagar	**I:** Srinagar (SKU), Pantnagar, Solan, Nagaland, Katrain, Ranichauri, Mukteswar (CITH) **IV:** Ludhiana,IIVR, Ranchi, Sabour **V:** Bhubaneshwar (OUAT), Raipur **VII:**Jabalpur, Rahuri, Parbhani **VIII:** Bagalkot (UHS), IIHR
2.	PFBP-25	2017	GBPUAT, Pantnagar	
3.	PFBP-28	2017	GBPUAT, Pantnagar	
4.	BSRB-1-17	2017	BBSR, OUAT, Bhubaneshwar	
5.	Laxami (P-7)	2017	YSPUH&F, Solan	
6.	Swarna Priya (C)	-	RCER, Ranchi	
7.	SVM-1 (C)	-	Solan	
8.	Local (C)			

Seed Quantity	:	200g	Total centres	:	18
Seed supply	:	20th May (18+3 pkt)	Design	:	RBD
Plot size	:	4.0 × 3.0 m	Replications	:	4
Spacing	:	50 × 20 cm			

7. Dolichos bean (Bush) AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	GNIB 21	2017	NAU, Navsari	**I:** Srinagar (SKU), Pantnagar, Solan, **IV:** Ludhiana,IIVR, Ranchi, Kalyanpur **V:**Bhubaneshwar (OUAT), Raipur, Lam **VI:** IARI, Hisar, Durgapura, NHRDF(Nasik), Navsari **VII:**Jabalpur, Rahuri, Parbhani **VIII:** Bagalkot (UHS), IIHR, Vellanikkara
2.	NIBD 14-01	2017	NAU, Navsari	
3.	VRBSEM-18	2017	IIVR, Varanasi	
4.	VRBSEM-14	2017	IIVR, Varanasi	
5.	Arka Soumya	2017	IIHR, Banagalore	
6.	Arka Vijay (C)	-	IIHR, Banagalore	
7.	Arka Jay (C)	-	IIHR, Banagalore	
8.	Local (C)	-		

Seed Quantity	:	150g	Total centres	:	21
Seed supply	:	20th May (21+3 pkt)	Design	:	RBD
Plot size	:	3.6 × 3.0 m	Replications	:	3
Spacing	:	45 × 30 cm			

8. Dolichos bean (Pole) AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	Arka Vistar	2017	IIHR, Bangaluru	**I:** Srinagar (SKU), Solan, Ranichauri **II:** Kalyani **IV:** Ludhiana,IIVR, Ranchi **V:**Bhubaneshwar (OUAT), Raipur, Lam **VI:** IARI, Durgapura, NHRDF (Nasik), Junagadh **VII:**Jabalpur, Rahuri, Parbhani, Akola **VIII:** Bagalkot (UHS), IIHR, Vellanikkara
2.	DB-22	2017	IARI, New Delhi	
3.	GJIB-13-07	2017	JAU, Junagadh	
4.	Kashi Haritima (C)	-	IIVR, Varanasi	
5.	Pusa Early Prolific (C)	-	IARI, New Delhi	
6.	Swarna Utkrist (C)	-	RCER, Ranchi	
7.	Local (C)	-	-	

Seed Quantity	:	150g	Total centres	:	21
Seed supply	:	20th May (21+3 pkt)	Design	:	RBD
Plot size	:	4.5 × 3.0 m	Replications	:	4
Spacing	:	150 × 75 cm			

9. Garden Pea (Early) AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	VP-1429	2017	VPKAS, Almora	**I:** Solan, Almora, Pantnagar, Pithoragarh, Ranichauri, Srinagar (SKU) **III:** Nagaland, Passighat, Portblair **IV:** IIVR, Ludhiana, Faizabad, Kalyanpur, Ranchi **VI:** IARI, Durgapura **VII:** Jabalur, Rahuri, Parbhani **VIII:** IIHR, Bagalkot (UHS)
2.	GP-1001	2017	IARI, New Delhi	
3.	Arka Nirmal	2017	IIHR, Bangaluru	
4.	VRPE-105	2017	IIVR, Varanasi	
5.	AP-3 (C)	-	CSAUA&T, Kalyanpur	
6.	Kashi Uday(C)	-	IIVR, Varanasi	
7.	Local (C)	-		

Seed Quantity	:	300g	Total centres	:	21
Seed supply	:	30th June (18+3 pkt)	Design	:	RBD
Plot size	:	3.0 × 3.0 m	Replications	:	3
Spacing	:	30 × 10 cm			

10. Garden Pea (Mid) AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	VP-1018	2017	VPKAS, Almora	**I:** Solan, Almora, Palampur, Pithoragarh, Ranichauri **III:** Nagaland, Passighat, Portblair **IV:** IIVR, Ludhiana, Faizabad, Kalyanpur, Ranchi **VI:** IARI, Hisar, Durgapura **VII:** Jabalur, Rahuri, Parbhani **VIII:** IIHR, Bagalkot (UHS)
2.	VP-1437	2017	VPKAS, Almora	
3.	Line 1-2	2017	CSK HPKV, Palampur	
4.	DPP-SP-22	2017	CSK HPKV, Palampur	
5.	VRPE-905	2017	IIVR, Varanasi	
6.	VRP-7 (C)	-	IIVR, Varanasi	
7.	PC 531(C)	-	PAU, Ludhiana	
8.	Local (C)	-		

Seed Quantity : 300g
Seed supply : 30th June (21+3 pkt)
Plot size : 3.0 × 3.0 m
Spacing : 30 × 10 cm
Total centres : 21
Design : RBD
Replications : 3

11. Ridge gourd- AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	AHRG-29	2017	CIAH, Bikaner	**IV:** Ludhiana, IIVR, Sabour, Kalyanpur, Ranchi, Allahabad **V:**Bhubaneswar (OUAT), Hyderabad, Raipur **VI:** IARI, Junagadh, Navsari, Anand, Durgapura, CIAH **VIII:**IIHR, Coimbatore, Karikal
2.	Arka Prasan	2017	IIHR, Bangaluru	
3.	DRG-7	2017	IARI, New Delhi	
4.	VRRG-6A	2017	IIVR, Varanasi	
5.	Pusa Nasdar (C)	-	IARI, New Delhi	
6.	Kashi Shivani (C)	-	IIVR, Varanasi	
7.	Local (C)	-		

Seed quantity : 100g
Seed supply : 30th Oct. (18+3 pkt)
Plot size : 7.5 × 3.0 m
Spacing : 300 × 60 cm
Total Centres : 18
Design : RBD
Replication : 4

12. Sponge gourd-AVT-I

Sl. No.	Entry	Year	Source	Centres
1.	JSG-14-01	2017	JAU, Junagadh	**IV:** Ludhiana, IIVR, Sabour, Kalyanpur, Ranchi, Allahabad **V:**Bhubaneswar (OUAT), Hyderabad, Raipur **VI:** IARI, Junagadh, Navsari, Anand, Durgapura **VIII:**IIHR, Coimbatore, Karikal
2.	JSG- 14-06	2017	JAU, Junagadh	
3.	VRSG-17-1	2017	IIVR, Varanasi	
4.	VRSG-17-2	2017	IIVR, Varanasi	
5.	Pusa Supriya (C)	-	IARI, New Delhi	
6.	Kashi Divya (C)	-	IIVR, Varanasi	
7.	Local	-		

Seed quantity : 100g
Seed supply : 30th Oct. (17+3 pkt)
Plot size : 7.5 × 3.0 m
Spacing : 300 × 60 cm
Total Centres : 17
Design : RBD
Replication : 4

AVT-II Trials

1. Brinjal (Long) AVT - II

Sl. No.	Entry	Year	Source	Centres
1.	SK-BL-786	2016	SKUAS&T Srinagar	**I:** Srinagar (SKU), Srinagar(CITH), Solan **II:** Kalyani, Cooch Behar, Jorhat **III:** Barapani, Portblair, Nagaland **IV:** Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur **V:**Raipur, Bhubaneshwar (OUAT), Hyderabad **VI:** IARI, Junagadh, Hisar, Anand, Navsari **VII:** Jabalpur, Parbhani, Goa **VIII:** Coimbatore, IIHR
2.	BRBL-02	2016	Sabour, Bihar	
3.	BRBL-07	2016	Sabour, Bihar	
4.	DBL-92	2016	IARI, New delhi	
5.	PBL-234	2016	PAU, Ludhiana	
6.	IVBL-23	2016	IIVR, Varanasi	
7.	DBL-184	2016	IARI, New delhi	
8.	Kashi Taru (C)		IIVR, Varanasi	
9.	Pb. Sadabahar (C)		PAU, Ludhiana	
10.	Local (C)			

Seed Quantity : 10 g
Seed supply : 30th May
Plot size : 4.5 x 4.2 m
Spacing : 75 x 60 cm

Total centres : 27
Design : RBD
Replications : 3

2. Brinjal (Round) AVT - II

Sl.No.	Entry	Year	Source	Centres
1.	DBOR-94	2016	IARI, New Delhi	**I:**Srinagar (SKU), Pantnagar, Srinagar (CITH), **II:** Kalyani, Jorhat **III:** Barapani, Portblair, Nagaland **IV:** Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur **V:**Raipur, Bhubaneshwar (OUAT),Hyderabad **VI:** IARI, Junagadh, Hisar, Navsari **VII:** Jabalpur, Parbhani, Rahuri, Goa **VIII:** Coimbatore, IIHR
2.	PBR-25	2016	PAU, Ludhiana	
3.	GNRB-1	2016	Navsari, Gujarat	
4.	IVBR-17	2016	IIVR, Varanasi	
5.	DBR-03	2016	IARI, New Delhi	
6.	Pusa Kranti (C)	-	IARI, New Delhi	
7.	KS-224 (C)	-	Kalyanpur, Kanpur	
8.	Swarna Mani (C)	-	RCER, Ranchi	
9.	Local (C)	-		

Seed quantity : 10g
Seed supply : 30th May
Plot size : 4 .5 × 4.2 m
Spacing : 75 × 60 cm

Total Centres : 26
Design : RBD
Replication : 3

3. Tomato (Determinate) AVT - II

Sl. No.	Entry	Year	Source	Centres
1.	JTL-12-11	2016	Junagadh, Gugarat	**I:** Srinagar (SKU), Pantnagar, Almora, Pithoragarh, Srinagar (CITH) **III:** Barapani, Pasighat, Portblair, Nagaland **IV:** Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur **V:**Raipur, Bhubaneshwar (OUAT), Hyderabad **VI:** IARI, Junagadh, Hisar, Anand, Navsari, **VII:** Parbhani, Rahuri, Jabalpur **VIII:** IIHR, Coimbatore, Bagalkot (UHS), Dharwad (UAS)
2.	RCDT-1314	2016	ICAR-RCER, Ranchi	
3.	RCDT-1315	2016	ICAR-RCER, Ranchi	
4.	VT-1304	2016	Almora, Uttarakhand	
5.	VT-1311	2016	Almora, Uttarakhand	
6.	GBPT-08	2016	UAS, Dharwad	
7.	VRT-19	2016	IIVR, Varanasi	
8.	VRT-1	2016	IIVR, Varanasi	
9.	PBNT-5	2016	Parbhani, Maharashtra	
10.	RFT-S-1	2016	UAS, Dharwad	
11.	Kashi-Aman (C)	-	IIVR, Varanasi	
12.	Punjab Ratta (C)	-	PAU, Ludhiana	
13.	Local (C)	-		

Seed Quantity	:	10 g	Total centres	:	29
Seed supply	:	30th May	Design	:	RBD
Plot size	:	4.8 × 4.0 m	Replications	:	3
Spacing	:	60 × 50 cm			

4. Cherry Tomato AVT - II

Sl. No.	Entry	Year	Source	Centres
1.	Punjab Yellow Cherry	2016	PAU,Ludhiana	**I:** Srinagar (SKU), Pantnagar, Almora, Srinagar (CITH), Pithoragarh, Mukteshwar (CITH) **II:** Kalyani, Jorhat **III:** Barapani, Pasighat, Portblair, Nagaland **IV:** Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur **V:** Raipur, Hyderabad, **VI:** IARI, Junagadh, Hisar, Anand, Navsari **VIII:** IIHR, Bagalkot (UHS), Coimbatore, Vellanikkara
2.	Punjab Orange Cherry	2016	PAU,Ludhiana	
3.	CITH-CT-M-2	2016	CITH, Mukteshwar	
4.	CITH-CT-M-3	2016	CITH, Mukteshwar	
5.	Pusa Cherry tomato 1 (C)	-	IARI, New Delhi	
6.	Swarna Ratan (C)	-	ICAR-RCER Ranchi	
7.	Local (C)	-		

Seed Quantity	:	10 g	Total centres	:	29
Seed supply	:	30th May	Design	:	RBD
Plot size	:	4.8 x 4.0 m	Replications	:	3
Spacing	:	60 x 50 cm			

5. Chillies AVT - II

S.No.	Entry	Year	Source	Centres
1.	SKSC-1161	2016	SKUAS&T, Srinagar	**I:** Srinagar (SKU), Pantnagar, Solan, Srinagar (CITH), Palampur **II:** Jorhat, Kalyani, Cooch Bihar **IV:** Ranchi, Ludhiana, IIVR, **V:** Raipur, Bhubaneshwar (OUAT), Bhubaneshwar (CHES), Lam **VI:** IARI, Hisar, Anand **VII:** Parbhani, Rahuri, Jabalpur, Goa **VIII:** IIHR, Vellanikkara, Coimbatore, Bagalkot (UHS), Dharwad (UAS)
2.	SKSC-1162	2016	SKUAS&T, Srinagar	
3.	DC-1007	2016	UAS, Dharwad	
4.	CH-1	2016	Palampur, HP	
5.	BC 28-2	2016	Bhubaneswar, Orissa	
6.	Keerthi	2016	RARI, Kerala	
7.	Kashi Anmol (C)	-	IIVR, Varanasi	
8.	LCA - 334 (C)	-	Lam, Guntur	
9.	Local (C)	-		

Seed Quantity	:	20g	Total centres	:	27
Seed supply	:	30th May	Design	:	RBD
Plot size	:	4.2 x 3.5 m	Replications	:	3
Spacing	:	60 x 50 cm			

6. Bottle gourd AVT - II

Sl. No.	Entry	Year	Source	Centres
1.	BRBG-65	2016	BAU, Sabour	**I:** Srinagar (SKU), Pantnagar, Pithoragarh, Jammu, Solan **III:** Pasighat, Barapani, Portblair **IV:** Ranchi, Ludhiana, IIVR, Sabour, Faizabad, Kalyanpur, Allahabad, **V:** Raipur, Bhubaneshwar (OUAT), Hyderabad, **VI:** IARI, Junagadh, Navsari, **VII:** Rahuri, Chitrakoot, Jabalpur, Parbhani
2.	BRBG-23	2016	BAU, Sabour	
3.	NDBG-16	2016	NDUA&T, Faizabad	
4.	GH-30	2016	CCS HAU, Hisar	
5.	Pb. Barkat	2016	PAU, Ludhiana	
6.	VRBG-18	2016	IIVR, Varanasi	
7.	VRBG-3	2016	IIVR, Varanasi	
8.	Kashi Ganga(C)	-	IIVR, Varanasi	

9.	Arka Bahar (C)	-	IIHR, Bengaluru	**VIII:** Coimbatore, Bagalkot (UHS), Vellanikkara, IIHR
10.	Local (C)	-		

Seed Quantity : 100 g
Seed supply : 30th May
Plot size : 7.5 x 3.0 m
Spacing : 300 x 60 cm

Total centres : 29
Design : RBD
Replications : 3

7. Pumpkin AVT - II

Sl. No.	Entry	Year	Source	Centres
1.	NDPK-7-24	2016	NDUA&T, Faizabad	**IV:** Ludhiana, IIVR, Sabour, Kalyanpur, Faizabad, Ranchi **V:** Hyderabad, Raipur, Bhubaneswar (OUAT) **VI:** IARI, Navsari, Durgapura **VII:** Parbhani, Rahuri, Jabalpur, Akola, Goa
2.	PP-225	2016	PAU, Ludhiana	
3.	AP-1	2016	AAU, Anand	
4.	VRPK-230	2016	IIVR, Varanasi	
5.	Kashi Harit (C)	-	IIVR, Varanasi	
6.	Narendra Agrim (C)	-	NDUA&T, Faizabad	
7.	Pusa Vishvas (C)	-	IARI, New Delhi	
8.	Local (C)	-		

Seed quantity : 100 g
Seed supply : 30th Oct.
Plot size : 7.5 x 3.0 m
Spacing : 300 x 60 cm

Total Centres : 17
Design : RBD
Replication : 3

8. Sponge gourd AVT - II

Sl. No.	Entry	Year	Source	Centres
1.	VRSG-195	2016	IIVR,Varasnasi	**IV:** Ludhiana, IIVR, Sabour, Kalyanpur, Faizabad, Ranchi, Allahabad **V:** Bhubaneswar (OUAT), Hyderabad, Raipur **VI:** IARI, Junagadh, Navsari, Anand, Durgapura **VIII:** Coimbatore, Karikal
2.	PSG-126	2016	PAU, Ludhiana	
3.	JSG-13-07	2016	JAU, Junagadh	
4.	VRSG-2-12	2016	IIVR, Varanasi	
5.	Pusa Supriya (C)	-	IARI, New Delhi	
6.	Kasi Divya(C)	-	IIVR, Varanasi	
7.	Local	-		

Seed quantity : 100 g
Seed supply : 30th Oct.
Plot size : 7.5 × 3.0 m
Spacing : 300 × 60 cm

Total Centres : 18
Design : RBD
Replication : 3

9. Amaranth AVT - II

Sl. No.	Entry	Year	Source	Centres
1.	UHF Chaulai 12-1	2016	Ranichauri	**I:** Ranichauri, Srinagar (SKU), Solan **IV:** Ludhiana, IIVR, Sabour, Kalyanpur, Ranchi **V:**Hyderabad, Bhubaneswar (OUAT), Raipur **VI:** IARI, Navsari, Anand **VIII:**Vellanikkara, Coimbatore, IIHR
2.	HAMTH-21	2016	RCER, Ranchi	
3.	BAS 15-1	2016	OUAT, Bhubaneswar	
4.	HAMTH-13	2016	RCER, Ranchi	
5.	BAS 15-2	2016	OUAT, Bhubaneswar	
6.	Arka Suguna (C)	-	IIHR, Bangaluru	
7.	Arun (C)	-	KAU, Vellannikara	
8.	Local	-		

Seed quantity : 50 g
Seed supply : 30th Oct.
Plot size : 3.0 × 2.5 m
Spacing : 30 × 10 cm

Total Centres : 17
Design : RBD
Replication : 3

10. Cauliflower (Early) AVT - II

Sl. No.	Entry	Year	Source	Centres
1.	BRECF 101/13	2016	Sabour, Bihar	**IV:** IIVR, Ludhiana, Sabour, Ranchi **V:** Lam, Raipur **VI:** IARI, Junagadh, Hisar, Durgapura **VII:** Jabalpur, Rahuri, Parbhani
2.	BRECF 117/13	2016	Sabour, Bihar	
3.	DCE-7	2016	IARI, New Delhi	
4.	DCE-8	2016	IARI, New Delhi	
5.	DCE-28	2016	IARI, New Delhi	
6.	VRCF-86	2016	IIVR, Varanasi	
7.	Pusa Meghna (C)	-	IARI, New Delhi	
8.	Pusa Ashwini (DC- 31) (C)	-	IARI, New Delhi	
9.	Kashi Kunwari (C)	-	IIVR, Varanasi	

Seed quantity : 10 g
Seed supply : 30th May
Plot size : 2.25 × 1.20 m
Spacing : 45 × 30 cm
Total Centres : 14
Design : RBD
Replication : 4
Sowing Time : June/July

11. Cauliflower (Mid) AVT - II

Sl. No.	Entry	Year	Source	Centres
1.	DCME 12	2016	IARI, New Delhi	**I:**Solan, Katrain, Srinagar (SKU), Pantnagar (Sowing March-April) **IV:** IIVR, Ludhiana, Sabour, Ranchi **V:** Lam, Raipur **VI:** IARI, Junagadh, Hisar, Durgapura **VII:** Jabalpur, Rahuri, Parbhani
2.	DCME 334	2016	IARI, New Delhi	
3.	DCME 325	2016	IARI, New Delhi	
4.	DCME 22	2016	IARI, New Delhi	
5.	VRCF-50	2016	IIVR, Varanasi	
6.	Pusa Sharad (C)	-	IARI, New Delhi	
7.	Kashi Agahani (C)	-	IIVR, Varanasi	
8.	Local	-		

Seed quantity : 10 g
Seed supply : 30th June
Plot size : 3.00 × 2.0 m
Spacing : 60 × 50 cm
Total Centres : 18
Design : RBD
Replication : 4
Sowing Time: Zone I: March/ April; Other Zones: July/August

12. French bean (Bush) AVT - II

Sl. No.	Entry	Year	Source	Centres
1.	VLFB-1307	2016	VPKAS, Almora	**I:** Srinagar (SKU), Pantnagar, Almora, Solan, Katrain, Ranichauri, Mukteswar (CITH) **IV:** Ludhiana,IIVR, Ranchi, Sabour **V:**Bhubaneshwar (OUAT), Raipur, Lam **VII:**Jabalpur, Rahuri, Parbhani **VIII:** Bagalkot (UHS), IIHR
2.	VLFB-1405	2016	VPKAS, Almora	
3.	VRFBB-2 (Kashi Rajhansh)	2016	IIVR, Varanasi	
4.	VRFBB-91	2016	IIVR, Varanasi	
5.	CITH-FB-1	2016	CITH, Mukteswar	
6.	Swarna Priya (C)	-	RCER, Ranchi	
7.	Arka Suvidha (C)	-	IIHR, Bangaluru	
8.	Local (C)	-		

Seed Quantity : 500 g
Seed supply : 20th May
Plot size : 3.6 × 3.0 m
Spacing : 40 × 20 cm
Total centres : 19
Design : RBD
Replications : 3

13. Dolichos bean (Bush) AVT - II

Sl. No.	Entry	Year	Source	Centres
1.	VRBSEM-3	2016	IIVR, Varanasi	**I:** Srinagar (SKU), Pantnagar, Solan, Katrain **IV:** Ludhiana,IIVR, Ranchi, Kalyanpur **V:**Bhubaneshwar (OUAT), Raipur, Lam **VI:** IARI, Hisar, Durgapura, Karnal (NHRDF) **VII:**Jabalpur, Rahuri, Parbhani **VIII:** Bagalkot (UHS), IIHR, Vellanikkara
2.	VRBSEM-9	2016	IIVR, Varanasi	
3.	Arka Amogh	2016	IIHR, Bengaluru	
4.	Arka Prasidhi	2016	IIHR, Bengaluru	
5.	Arka Vijay (C)	-	IIHR, Bengaluru	
6.	Arka Jay (C)	-	IIHR, Bengaluru	
7.	Local (C)	-		

Seed Quantity : 500g
Seed supply : 20th May
Plot size : 3.6 × 3.0 m
Spacing : 45 × 30 cm
Total centres : 21
Design : RBD
Replications : 3

14. Dolichos bean (Pole) AVT - II

Sl. No.	Entry	Year	Source	Centres
1.	GJIB-13-03	2016	JAU, Junagadh	**I:** Srinagar (SKU), Solan, Ranichauri **II:** Kalyani **IV:** Ludhiana,IIVR, Ranchi **V:** Bhubaneshwar (OUAT), Raipur, Lam **VI:** IARI, Durgapura, Karnal (NHRDF), Junagadh **VII:** Jabalpur, Rahuri, Parbhani, Akola **VIII:** Bagalkot (UHS), IIHR, Vellanikkara
2.	UHF DV-1	2016	Ranichauri	
3.	DCBD-110	2016	BCKV, Kalyani	
4.	IS-2016-9	2016	IGKV, Raipur	
5.	IS-2016-10	2016	IGKV, Raipur	
6.	ArkaAdarsh	2016	IIHR,Bangaluru	
8.	DB-3	2016	IARI, New Delhi	
9.	DB-5	2016	IARI, New Delhi	
10.	Kashi Haritima (C)	-	IIVR, Varanasi	
11.	Pusa Early Prolific (C)	-	IARI, New Delhi	
12.	SwarnaUtkrist (C)	-	RCER, Ranchi	
13.	Local (C)	-	-	

Seed Quantity : 500g
Seed supply : 20th May
Plot size : 4.5 × 3.0 m
Spacing : 150 × 75 cm
Total centres : 21
Design : RBD
Replications : 3

15. Pea (Early) AVT - II

Sl. No.	Entry	Year	Source	Centres
1.	VP 1409	2016	VPKAS, Almora	**I:** Solan, Almora, Pantnagar, Pithoragarh, Ranichauri **III:** Nagaland, Passighat, Portblair **IV:** IIVR, Ludhiana, Faizabad, Kalyanpur, Ranchi, **VI:** IARI,Hisar, Durgapura **VIII:** IIHR, Bagalkot (UHS)
2.	VP 1422	2016	VPKAS, Almora	
3.	IIHR-2-9	2016	IIHR,Bangaluru	
4.	IIHR-5-13	2016	IIHR,Bangaluru	
5.	GP 912	2016	IARI, New Delhi	
6.	VRPE-103	2016	IIVR, Varanasi	
7.	AP-3 (C)	-	CSAUA&T, Kalyanpur	
8.	Kashi Udai (C)	-	IIVR, Varanasi	
9.	Local (C)	-	-	

Seed Quantity : 500g
Seed supply : 30th June
Plot size : 3.0 × 3.0 m,
Spacing : 30 × 10 cm
Total centres : 18
Design : RBD
Replications : 3

16. Pea (Mid) AVT - II

Sl. No.	Entry	Year	Source	Centres
1.	HVPe-3-5	2016	CCS HAU, Hisar	**I:** Solan, Almora, Palampur, Pithoragarh, Ranichauri **III:** Nagaland, Passighat, Portblair **IV:** IIVR, Ludhiana, Faizabad, Kalyanpur, Ranchi **VI:** IARI,Hisar, Durgapura **VII:** Jabalur, Rahuri, Parbhani **VIII:** IIHR, Bagalkot (UHS)
2.	VP 1345	2016	VPKAS, Almora	
3.	VP 1346	2016	VPKAS, Almora	
4.	Selection-63	2016	Bundelkhand Seeds	
5.	Chamtkar	2016	Bundelkhand Seeds	
6.	KTP-161	2016	Katrain, IARI (RS)	
7.	KTP-162	2016	Katrain, IARI (RS)	
8.	VRP-7 (C)	-	IIVR, Varanasi	
9.	PC 531	-	Ludhiana	
10.	Local (C)	-		

Seed Quantity : 500g
Seed supply : 30th June
Plot size : 3.0 × 3.0 m,
Spacing : 30 × 10 cm
Total centres : 21
Design : RBD
Replications : 3

17. Cowpea (Bush type) AVT - II

Sl. No.	Entry	Year	Source	Centres
1.	VRCP -112	2016	IIVR, Varanasi	**I:** Pantnagar,Almora, Solan **IV:** IIVR, Ludhiana, Sabour, Ranchi, Allahabad **V:** Bhubaneswar (OUAT), Lam, Raipur **VI:** IARI, Durgapura, Jagudan, **VII:** Parbhani, Jabalpur, Rahuri, Akola, Chitrakoot **VIII:** IIHR, Coimbatore, Vellanikkara
2.	VRCP-49-5	2016	IIVR, Varanasi	
4.	Palam Long Bean	2016	CSK HPKV, Palampur	
5	Jawahar Cowpea-1	2016	JNKVV, Jabalpur	
6.	Kashi Nidhi (C)	-	IIVR, Varanasi	
7.	Arka Garima (C)	-	IIHR,Bangaluru	
8.	Local (C)	-		

Seed Quantity : 300g
Seed supply : 30th May
Plot size : 3.6 × 3.0 m
Spacing : 90 × 30 cm
Total centres : 22
Design : RBD
Replications : 3

18. Carrot (Tropical) AVT - II

Sl. No.	Entry	Year	Source	Centres
1.	IPC-1	2016	IARI, New Delhi	**IV:** IIVR, Ludhiana, Ranchi **VI:** IARI, Hisar, Durgapura **VII:** Jabalpur, Rahuri, Parbhani **VIII:** IIHR, Bagalkot (UHS), Coimbatore
2.	IPC-2	2016	IARI, New Delhi	
3.	IPC-3	2016	IARI, New Delhi	
4.	VRCAR-185	2016	IIVR, Varanasi	
5.	VRCAR-186	2016	IIVR, Varanasi	
6.	Pusa Kesar (C)	-	IARI, New Delhi	
7.	Pusa Rudhira (C)	-	IARI, New Delhi	

Seed quantity : 20g
Seed supply : 30th July
Plot size : 2.40 × 2.50m
Spacing : 40 × 10 cm
Total Centers : 12
Design : RBD
Replication : 3
Sowing Time : September/October

Observations to be recordedolanaceous crops

Capsicum (Bell pepper)

Days to first marketable fruit harvest	Total Marketable fruit Yield (q/ha) (data of all pickings to be pooled)	Avg frt wt (g) (to be taken from 5 fruits between 2^{nd}& 4^{th} Picking)	Fruit length (cm) (to be taken between 2^{nd}& 4^{th} picking with Vernier Callipers)	Fruit diameter (cm) (to be taken between 2^{nd}& 4^{th} picking with Vernier Callipers)	Fruit color To be taken at mature green Stage Between at 2^{nd}& 4^{th} picking (as light green, green or dark green)	No. of locules Per fruit (to be taken between 2^{nd}& 4^{th} Picking)	Vitamin C Content (mg/100g) (to be done at IIVR, IIHR, IARI, BCKV & PAU for all AVT II trials)	Reaction to major biotic stresses like **viruses, BW & powdery mildew** as tolerant or susceptible

Brinjal

Days to first marketable fruit maturity	Total Marketable fruit Yield (q/ha) (data of all pickings to be pooled)	Avg frt wt (g) (to be taken from 5 fruits between 2^{nd}& 4^{th} Picking)	Fruit length (cm) (to be taken between 2^{nd}& 4^{th} picking with measuring scale)	Fruit Diameter (cm) (to be taken between 2^{nd}& 4^{th} picking with vernier callipers)	Fruit color (to be taken at market maturity stage between 2^{nd}& 4^{th} picking)	Calyx colour (to be taken at market maturity stage between 2^{nd}& 4^{th} picking)	Phenol content of the fruit at marketable maturity (mg/100g) (to be done at IIVR, IIHR, IARI, BCKV & PAU for all AVT II trials)	Reaction to major biotic stresses like **FSB, BW & nematodes** as tolerant or susceptible

Chilli

Days to first red ripe fruit harvest	Total Marketable red ripe Yield (q/ha) (data of all pickings to be pooled)	Avg frt wt (g) to be taken from 20 fruits between 2^{nd}& 4^{th} Picking	Fruit length (cm) to be taken between 2^{nd}& 4^{th} picking with Vernier Callipers	Fruit diameter (cm) to be taken between 2^{nd}& 4^{th} picking with Vernier Callipers	Fruit color at mature green stage taken between 2^{nd}& 4^{th} picking (as light green, green or dark green)	Fruit color at mature red ripe stage taken between 2^{nd}& 4^{th} picking (as light red, red or dark red)	Pungency (organo leptic & biochemical analysis) at mature green stage taken between 2^{nd}& 4^{th} picking (to be done at IIVR, IIHR, IARI, BCKV & PAU for all AVT II trials)	Vit C Content (mg/100g) (to be done at IIVR, IIHR, IARI, BCKV & PAU for all AVT II trials)	Reaction to major biotic stresses **(LCV, powdery mildew & fungal wilt)** as tolerant or susceptible

Tomato

Days to first fruit picking	Total Marketable Yield (q/ha) (data of all pickings to be pooled)	Avg frt wt (g) taken from 10 fruits between 2^{nd}& 4^{th} Picking	Fruit shape taken between 2^{nd}& 4^{th} Picking	Equatorial Diameter (cm) taken between 2^{nd}& 4^{th} Picking with Vernier Callipers	Polar Diameter (cm) taken between 2^{nd}& 4^{th} Picking with Vernier Callipers	TSS (^{0}Brix) taken at red ripe stage taken 2^{nd}& 4^{th} Picking (to be done at IIVR, IIHR, IARI, BCKV & PAU for all AVT II trials)	Acidity % taken at red ripe stage taken 2^{nd}& 4^{th} Picking (to be done at IIVR, IIHR, IARI, BCKV & PAU for all AVT II trials)	Fruit firmness (kg/cm^{2}) taken at red ripe stage taken 2^{nd}& 4^{th} picking (to be done at IIVR, IIHR, IARI, BCKV & PAU for all AVT II trials)	Reaction to major biotic stresses (**LCV, BW & Tospovirus**) as tolerant or susceptible

Cucurbitaceous crops

Ash gourd

Days to first picking	Average fruit weight (should be recorded at the time of final harvesting of 5 fruits)	Fruits/plant (Data of all pickings to be pooled)	Marketable yield (q/ha) (Data of all pickings to be pooled)	Shape of fruit : Oblong/Round/Cylindrical (should be recorded the time of final harvesting)	Reaction to major biotic stresses (**Downy mildew and anthracnose**) as tolerant or susceptible

Bitter gourd

Days to first picking	Average fruit weight (should be recorded at $2^{nd}/3^{rd}$ picking, average of 5 fruits at marketable maturity)	Fruits/ plant	Marketable yield (q/ha) (Data of all pickings to be pooled)	Fruit colour – Dark green/green/creamy : Should be assessed at the time of measurement of fruit length	Ridges on fruit : Continuous/ Discontinuous	Shape of fruit : spindle/ cylindrical/ globular	Reaction to major biotic stresses (**Powdery mildew, Leaf curl virus, Downy mildew**) as tolerant or susceptible

Bottle gourd

Days to first picking	Average fruit weight (should be recorded at $4^{th}/5^{th}$ picking, average of 5 fruits at marketable maturity)	Fruits/plant (Data of all pickings to be pooled)	Marketable yield (q/ha) (Data of all pickings to be pooled)	Colour of fruit : Green/light green/dark green with or without patches	Shape of fruit : Round/cylindrical/club/others (specify)	Reaction to major biotic stresses (**Powdery mildew, gummy stem blight and anthracnose**) as tolerant or susceptible

Cucumber

Days to first picking	Average fruit weight (should be recorded at 2nd/3rd picking of 5 fruits at marketable maturity)	Fruit length (should be recorded at 2nd/3rd picking: average of 5 fruits at marketable maturity)	Fruit diameter in middle (should be recorded at 2nd/3rd picking: average of 5 fruits at marketable maturity)	Fruits/ plant	Marketable yield (q/ha) (Data of all pickings to be pooled)	Fruit colour – Dark green with or without stripes (white tinge)/Light green with or without stripes (white tinge)/Creamy/Others : should be recorded at 2nd/3rd picking at marketable maturity	Bitterness (should be assessed in the middle of fruit) (should be recorded at 2nd/3rd picking)	Reaction to major biotic stresses (**downy mildew, powdery mildew, mosaic virus**) as tolerant or susceptible

Pumpkin

Days to first picking	Average fruit weight (should be recorded at harvest of 5 fruits)	Fruits/plant	Marketable yield (q/ha)	Colour of fruit : Cream/Dark Green/light green with or without mottles at immature stage	Shape of fruit : Flat round/ Round/ Oval/Cylindrical	Flesh colour : cream/yellow/orange : should be recorded at full mature stage	Flesh thickness (cm) : should be recorded at full mature stage	Reaction to major biotic stresses (**ZYMV, PRSV**) as resistant or susceptible

Ridge gourd

Days to first picking	Average fruit weight (should be recorded at 3rd /4th picking, average of 5 fruits at marketable maturity)	Fruits/ plant	Fruit length (should be recorded at 3rd /4th picking, average of 5 fruits at marketable maturity)	Fruit diameter in middle of fruit (should be recorded at 3rd /4th picking, average of 5 fruits at marketable maturity)	Marketable yield (q/ha) (Data of all pickings to be pooled)	Colour of fruit : Dark green/green/light green	Reaction to major biotic stresses (**Powdery mildew, Leaf curl virus, Downy mildew & fungal wilt**) as tolerant or susceptible

Sponge gourd

Days to first picking	Average fruit weight (should be recorded at 3rd /4th picking, average of 5 fruits at marketable maturity)	Fruit length (should be recorded at 3rd /4th picking, average of 5 fruits at marketable maturity)	Fruit diameter in middle of fruit (should be recorded at 3rd /4th picking, average of 5 fruits at marketable maturity)	Fruits/plant	Marketable yield (q/ha) (Data of all pickings to be pooled)	Fruit colour Dark green/green/light green with or without stripes : should be recorded at 3rd /4th picking of 5 fruits at marketable maturity	Reaction to major biotic stresses (**Powdery mildew, Leaf curl virus, Downy mildew**) as tolerant or susceptible

Melons:

Watermelon

Days to first picking	Average fruit weight (should be recorded at harvest of 5 fruits)	Fruits/ Plant (Data of all pickings to be pooled)	Marketable yield (q/ha) (Data of all pickings to be pooled)	Shape of fruit : Oblong/Round/ elongate	Colour of fruit : Dark green/Light green with or without stripes/mottles	TSS: should be recorded at harvest of 5 fruits	Flesh colour: Dark red/Pink/yellow	Reaction to major biotic stresses (**Gummy stem blight, WBNV, Fusarium wilt**) as tolerant or susceptible

Muskmelon

Days to first picking	Average fruit weight (should be recorded at harvest of 5 fruits)	Fruits/ plant (Data of all pickings to be pooled)	Marketable yield (q/ha) (Data of all pickings to be pooled)	Shape of fruit : Oblong/Round/oval /flat globe	Colour of fruit : Green/ Cream/ Yellow/Brown	Fruit surface netting : Absent/ Present	Fruit sutures: Absent/ present	TSS: should be recorded at harvest of 5 fruits	Flesh colour: Cream/ white/ Orange/ Green	Reaction to major biotic stresses (**Gummy stem blight, *Fusarium* wilt, Downey mildew**) as tolerant or susceptible

Long melon

Days to first picking	Average fruit weight (should be recorded at harvest of 5 fruits)	Fruits/ plant (Data of all pickings to be pooled)	Marketable yield (q/ha) (Data of all pickings to be pooled)	Shape of fruit : Oblong/Round/oval/flat globe	Fruit Girth (cm)	Fruit Length (cm)	No. of fruit /plant	Average fruit weight (g) Average of five fruits	Duration of crop (Sowing to last harvest)	Reaction to major biotic stresses (**Gummy stem blight, *Fusarium* wilt, Downey mildew**) as tolerant or susceptible

Leguminaceae

Pea Early (Sowing season: November in North and South India; and March in hills**)**

Days to first harvest	Total Marketable Yield q/ha (Data of all pickings to be pooled)	No of pods/plant (Data of all pickings to be pooled)	Selling (%) (Wt of green seeds ÷ wt of green pod) x100	Pod shape (Straight/ slightly curved)	Average pod weight (Avg. of 10 pods)	Total sugars	Pod length (cm) (Avg. of 10 pods)	**Biotic stress susceptibility**		
								Disease incidence, if any (%)	Insect pest infestation, if any (%)	No. of root-knot galls/plant

Pea mid season: (Sowing season: November in North and South India; and March in hills**)**

Days to first harvest	Total Marketable Yield q/ha (Data of all pickings to be pooled)	No of pods/plant (Data of all pickings to be pooled)	Shelling (%) (Wt of green seeds ÷ wt of green pod) x100	Pod shape (Straight/ slightly curved)	Average pod weight (Avg. of 10 pods)	Total sugars	Pod length (cm) (Avg. of 10 pods)	**Biotic stress susceptibility**		
								Disease incidence, if any (%)	Insect pest infestation, if any (%)	No. of root-knot galls/plant

Cowpea (Season: Kharif)

Days to first pod harvest	Marketable green pod yield q/ha	Number of pods / plant (Avg. of 5 plants)	Pod colour (Green/ Light green/ dark green)	Pod cross-section shape (round or flat or oval)	Pod length (cm) (Avg. of 10 pods)	Pod width (cm) (Avg. of 10 pods)	Pod stringiness (stringed or stringless)	Plant height (cm) Av of 10 plants	Pod weight (g) (Avg. of 20 fruits)	Disease incidence, if any (%)	Insect pest infestation, if any (%)	No. of root- knot galls/plant

Yard Long Bean (Season: Kharif)

Days to first pod harvest	Marketable green pod yield q/ha	Number of pods / plant (Avg. of 5 plants)	Pod colour (Green/ Light green/ dark green)	Pod cross-section shape (round or flat or oval)	Pod length (cm) (Avg. of 10 pods)	Pod width (cm) (Avg. of 10 pods)	Plant height (cm) Av of 10 plants	Pod weight (g) (Avg. of 20 fruits)	Disease incidence, if any (%)	Insect pest infestation, if any (%)	No. of root- knot galls/plant

French bean (Bush and Pole): Sowing season: July in South India; November in North India; and February in hills

Days to first pod harvest	Marketable pod yield q/ha	Number of pods / plant (Avg. of 5 plants)	Pod colour (Green/ Light green/ dark green/ purple)	Pod cross-section shape (round or oval or flat)	Pod curvature (straight/curved/ slight curved)	Pod length (cm) (Avg. of 10 pods)	Pod Width (cm)	Pod weight (g) (Avg. of 20 pod)	Disease incidence, if any (%)	Insect pest infestation, if any (%)	No. of root- knot galls/plant

Dolichos bean (Bush and Pole) : (Season: Kharif for photo-insensitive types and rabi for photo sensitive type)

Days to first pod harvest	Green pod yield q/ha	Number of pods / plant (Avg. of 10 plants)	Pod colour (white/ creamish/ light green/ greenish/ purple/ other	Pod shape (straight/ curved/ intermediate)	Pod cross-section shape (flat/round)	Pod length (cm) (Avg. of 10 pods)	Pod width (cm) (Avg. of 10 pods)	Pod weight (g) (Avg. of 10 pods)	Plant height (cm) Av of 10 plants	Disease incidence, if any (%)	Insect pest infestation, if any (%)	No. of root-knot galls/plant

Cruciferous vegetables

Cabbage

Days of 50% heading	NHW (g) (Avg. of 5 heading)	MHW (g) (Avg. of 5 heading)	GPW (Avg. of 5 plants)	Marketable head yield (q/ha)	Head color	Head compactness	Core length	Head polar (cm) (Avg. of 5 head)	Head equatorial length (cm) (Avg. of 5 head)	Head shape	Harvest Index	Day to Maturity	Disease incidence, if any (%)	Insect pest infestation, if any (%)

NHW: Net head weight (without non-wrapper leaves); MHW: Marketable head weight (with 2-3 loosely covered non-wrapper leaves); GPW: Gross plant weight; Head colour: light green (LG), green (G), dark green (DG), purple (P); Head compactness: Z=C*100/W3 C= NHW in gram, W= Average of polar and equatorial dia (cm); Head shape: flat (F), round (R), oval (O); HI: Harvest index (NHW*100/GPW); DTM: Days to maturity (transplanting to final harvest).

Cauliflower

(Early season (>25 °C): Mid July-mid August transplanting in North India, Kharif in Hyderabad)
(Mid season (20-25 °C): September transplanting in North India, Late Kharif in Hyderabad)
(Late season (<12 °C): Mid-October to mid-November transplanting in North India, March in Hills)
Crop should get mentioned temperature at the time of curd initiation and development

Days to 50% curd formation	NCW (g) (Avg. of 5 curd)	MCW (g) (Avg. of 5 curd)	GPW (Avg. of 5 plants)	Marketable curd yield (q/ha)	Curd color	Curd compactness	Plant growth type	Curd length (cm) (Avg. of 5 curd)	Curd width (cm) (Avg. of 5 curd)	HI	DTM	Riceyness and leafiness (Present/absent)	Disease incidence, if any (%)	Insect pest infestation, if any (%)

NCW: Net curd weight (without expanded leaves); MCW: Marketable curd weight (with 3-4 expanded leaves); Unmarketable yield includes ricey, leafy and fuzzy curds; GPW: Gross plant weight; Curd colour: Yellow (Y), creamish-white (CW), white (W), snow-white (SW); Curd compactness: Loose, Medium compact, Compact; Plant growth type: Spreading (S), Semi-spreading (SS), Self-blanched or semi-erect SB); HI: Harvest index (NCW*100/GPW); DTM: Days to maturity (transplanting to final harvest).

Radish

Days to 1st root harvest	Plant biomass (g) (Av of 10 plants)	Root weight (g) (Av of 10 plants)	Marketable yield (q/ha)	Root length (cm) (Av. of 10 roots)	Root dia at mid-portion (cm) (Av. of 10 roots)	Root colour (exterior)	Pithiness at harvest (present, absent)	Bolting (present, absent)	Disease incidence, if any (%)	Insect pest infestation, if any (%)

Other vegetable crops:

Amaranth (*Kharif* sowing)

Total biomass weight (kg/plot)	Plant height at 1st cutting (cm)	Biomass yield (q/ha)	Leaf colour	Stem colour	Reaction to white rust

Bathua (Chenopodium, Rabi sowing)

Total biomass weight (kg/plot)	Plant height at 1st cutting (cm)	Biomass yield (q/ha)	Leaf colour	Stem colour

Carrot

Days to 1st root harvest	Plant biomass (g) (Av of 10 plants)	Root weight (g) (Av of 10 plants)	Marketable root yield (q/ha)	Harvest Index	Root length (cm) (Av. of 10 roots)	Root dia at mid-portion (cm) (Av. of 10 roots)	Days to maturity	Root colour	% of self-coloured core	Secondary roots (absent, less, present)	Disease incidence, if any (%)	Insect pest infestation, if any (%)

Okra (Kharif in North India, Late Summer in South India)

Plant height at last harvest (cm)	No. of ridges /fruit	Av fruit wt (g)	Days to first harvest	Fruit length (cm)	Fruit dia at mid portion	No. of Fruit /plant	Ave-rage fruit weight	Fruit colour at marke-table stage	Fruit texture (smooth/ hairy)	Dura-tion of Crops	Marke-table yield (q/ha)	Disease incidence of YVMV and ELCV (%) at 30, 60 and 90 DAYS	Insect pest infestation (fruit borer, aphids and jassids (%)	Fusarium/ Rhizoctonia wilt (% incidence)	Remarks or any other impor-tant para-meter

Lettuce

Variety type (heading / non heading)	Maturity days (at final harvesting)	Days to first harvest	Plant height at last harvest (cm)	Leaf colour at marketable maturity (Light green, green, dark green,purple/red)	Marketable yield (g/plant)	Marketable yield (q/ha)	Disease incidence % (lettuce drop, downy mildew, wilt)

SESSION –IV

Hybrid Evaluation

Chairperson	:	Dr. K. E. Lawande, Former Vice Chancellor, KKV, Dapoli
Co-Chairperson	:	Dr. S.J Singh, Director, RARI, Durgapura
Convener	:	Dr. N. Rai, Principal Scientist, ICAR-IIVR, Varanasi
Rapporteurs	:	Dr. B. K. Singh, Scientist, ICAR-IIVR, Varanasi Dr. H. Choudhary, Principal Scientist, ICAR-IARI, New Delhi

At the outset, the Chairman welcomed the delegates from different centres and started the session with introductory remarks highlighting the contribution of Horticulture in Indian economy and role of hybrids in increasing the production and productivity of vegetable crops. Initially, the hybrid development programme was started by public sector which has been aggressively taken over by private sectors with the support of breeding lines developed by public sectors. The performance of many hybrids developed by public sector institutions are very encouraging which could be commercialized through public private partnership by entering into MOU/Licensing with different private companies on non exclusive basis.

During the year 2016-17, a total of 342 trials were conducted at 46 coordinating centres, out of which 341 were reported, while during the year 2017-18, a total of 397 trials were allotted among 43 coordinating centres, out of which 94 were reported and 303 were under progress. The report of hybrid trials on Solanaceous and Cucurbitaceous crops was presented by Dr. A.S. Dhatt and Dr. B. Varalakshmi presented the reports of Cole crops and Okra.

After thorough discussion the following recommendations /suggestions emerged.

Suggestions:

- The hybrid evaluation trials should be formulated on the basis of suitable location for expression of full yield potential of the respective crop and it should not be tested at those locations where crop performance is not up to the mark. PC should thoroughly scrutinize the testing programme.
- It is suggested that description of specific segments/ maturity period for test entries should be clearly mentioned to avoid the mixing of test entries from different maturity groups and to facilitate the trials for specific segments.
- Private sector should deposit the testing fees for 3 years well in advance at the time of initiation of the trial. PC should ensure that the fee is deposited in advance. In case of failure, seed should not be accepted.
- Funding and administrative issues should only be discussed in the performance evaluation session chaired by DDG/ADG, ICAR and should not be raised in technical sessions to justify their poor performance.
- Okra hybrids/varieties should be discussed in resistant breeding session to have proper interaction with virologists.
- A drastic variation in yield was observed at some centres for which they could not give logical explanation. Such centres are advised to take serious note and conduct the trials properly with utmost care. PC should ask written intimation from such centers.
- It was observed that at many centres the trials are in progress, even after the normal cropping period. The centres are advised to shed casual approach and report on time.

- It was suggested to discuss the result of only 1 year trial so that complete data will be available from all testing centres and a meaningful interpretation can be drawn.
- The sub-optimal yield of any centres should not be considered for discussion. The Project Coordinator should take stock of such centres separately.
- Besides yield, specific characters that are required for which the hybrids is proposed for testing, should be recorded properly.
- The chairman showed concerns about many emerging diseases of different vegetable crops like tospovirus in tomato, watermelon, enation leaf curl virus in okra and leaf curl in chilli and emphasized the greater participation of private sector to develop and test their hybrids.

Recommendations:

- In many cases, seeds of entries in AVT-I onwards are not being supplied by developing centre /private companies. Therefore, timely supply of seeds for experimental trials should be ensured. **(Action: All Centres; PC, AICRP-VC)**
- The coding of entries done by PC cell should be decoded every year during the annual workshop so that each developing centre/ private companies will be able to know the performance of their entries in different zone of the country. The decoding of entries will also facilitate in ranking of hybrids and its comparison with the checks. **(Action: PC, AICRP-VC)**
- The data generated for performance of varieties/hybrids being tested by AICRP (VC) at different location of a particular state should also be accepted by the respective state Governments to avoid the duplication of the testing being mandated by some of the states. PC should take this matter to ICAR headquarter and there should be common consensus on this issue between center and states.
- In recording ancillary observations, the guidelines set by AICRP (VC) while planning experiments, should be followed stringently for avoiding confusion at the time of compilation and reporting of data.
- The reason for failure of trials should be communicated immediately to the PC Cell with proper justification and appropriate photographs which should be reflected in the final reports.

TECHNICAL PROGRAMME (2018-19)

A. IET -Hybrid Trials

1. Brinjal Hybrid Long IET

Sl. No.	Entry	Year	Source	Centres
1.	SKUTBH-1	2018	SKUAST, Srinagar	**I:** Srinagar (SKUAST), Pantnagar, Pithoragarh **II:** Kalyani, Cooch Behar **III:** Barapani, Portblair **IV:** Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur **V:** Hyderabad **VI:** IARI, Junagadh **VII:** Jabalpur, Parbhani, Goa **VIII:** Coimbatore, IIHR
2.	DBHL2110	2018	IARI, New Delhi	
3.	DBHL2100	2018	IARI, New Delhi	
4.	BNB-6424	2018	Bharat Nursery, Kolkata	
5.	IVBHL-22	2018	IIVR, Varanasi	
6.	Punjab Sadabahar (C)	-	PAU, Ludhiana	
7.	Naveena (C)	-	VNR, Seeds	
8.	ARBH-486(C)	-	Ankur Pvt Ltd	

Seed quantity : 10g
Seed supply : 30th May (20+3 pkt)
Plot size : 4.5 × 3.0 m
Spacing : 75 × 60 cm
Total Centres : 20
Design : RBD
Replication : 3

2. Brinjal Hybrid Round IET

Sl. No.	Entry	Year	Source	Centres
1.	DBHR-25	2018	IARI, New Delhi	**I:** Srinagar (SKU), Pantnagar, Pithoragarh **II:** Kalyani, Cooch Behar **III:** Barapani, Portblair **IV:** Sabour, Ranchi, Ludhiana, IIVR, Kalyanpur **V:** Raipur, Hyderabad **VI:** IARI, Junagadh **VII:** Jabalpur, Parbhani, Goa **VIII:** Coimbatore, IIHR
2.	DBHR-2340	2018	IARI, New Delhi	
3.	BNB-422	2018	Bharat Nursery, Kolkata	
4.	IVBHR-18	2018	IIVR,Varanasi	
5.	JBH-13-04	2018	JAU, Junagadh	
6.	JBH-14-10	2018	JAU, Junagadh	
7.	Pusa Hybrid-6 (C)	-	IARI, New Delhi	
8.	Kashi Sandesh (C)	-	IIVR,Varanasi	
9.	Swarn Mani (C)	-	RCER (Ranchi)	

Seed quantity : 10g
Seed supply : 30th May (21+3 pkt)
Plot size : 4.5 × 3.0 m
Spacing : 75 × 60 cm
Total Centres : 21
Design : RBD
Replication : 3

3. Chilli Hybrid/Hot Pepper IET

Sl. No.	Entry	Year	Source	Centres
1.	UARChH-42	2018	UAS Raichur	**I:** Srinagar (SKU), Pantnagar, Srinagar (CITH), Palampur, Pithoragarh **II:** Kalyani, Cooch Bihar **IV:** Ranchi, Ludhiana, IIVR **V:** Raipur, Bhubaneshwar (OUAT), Lam **VI:** IARI, Hisar, Anand **VII:** Parbhani, Rahuri, Jabalpur, Goa
2.	UARChH-43	2018	UAS Raichur	
3.	CCH-10	2018	IIVR,Varanasi	
4.	TMPH-424	2018	Trimurti Seed	
5.	VNR-145	2018	VNR Seeds	
6.	VNR-305	2018	VNR Seeds	
7.	MH-3201	2018	Metahelix Seeds	

Sl. No.	Entry	Year	Source	Centres
8.	BSS-453(C)	-	Bejo Sheetal Seeds	**VIII:** IIHR, Coimbatore, Bagalkot (UHS), UAS - Raichur
9.	ARCH-228 (C)	-	Ankur Seeds	
10.	Kashi Anmol(C)	-	IIVR,Varanasi	

Seed quantity : 50g
Seed supply : 30th May (24+3 pkt)
Plot size : 4.2 × 3.5 m
Spacing : 60 × 50 cm
Total Centres : 24
Design : RBD
Replication : 3

4. Okra Hybrid (YVMV) IET

Sl. No.	Entries	Year	Source	Centres
1.	NOH-05	2018	Nath Biogenes	**I:** Jammu, Pantnagar **II:** Kalyani **IV:** IIVR, Ludhiana, Kalyanpur **V:** Bhubaneshwar (OUAT), Hyderabad, Lam **VI:** IARI, Hisar, Junagadh, Navsari **VII:** Rahuri, Jabalpur, Parbhani, Akola, Dapoli **VIII:** Coimbatore, IIHR, Bengaluru, Vellanikkara
2.	VROH-15	2018	IIVR, Varanasi	
3.	MO-203	2018	Metahelix Seeds	
4.	MO-205	2018	Metahelix Seeds	
5.	Kashi Kranti (C)	-	IIVR, Varanasi	
6.	Pusa Sawani (C)	-	IARI, New Delhi	
7.	Arka Anamika (C)	-	IIHR, Bengaluru	

Seed Quantity : 100g
Seed supply : 30th May(22+3 pkt)
Plot size : 3.0 × 2.7 m
Spacing : 60 × 30 cm
Total centres : 22
Design : RBD
Replications : 3

5. Bottle gourd Hybrid IET

Sl. No.	Entries	Year	Source	Centres
1.	NDBGH-14-10	2018	NDUA&T, Faizabad	**I:** Srinagar (SKU), Pantnagar, Pithoragarh, Jammu **III:** Barapani, Portblair **IV:** Ranchi, Ludhiana, IIVR, Sabour, Faizabad, Kalyanpur, Allahabad **V:**Bhubaneshwar (OUAT), Hyderabad **VI:** IARI, Junagadh **VII:** Rahuri, Chitrakoot, Jabalpur, Parbhani **VIII:** Coimbatore, Bagalkot (UHS), IIHR, Vellanikara
2.	BRBGH-1-18	2018	BAU, Sabour	
3.	VRBGH-2	2018	IIVR, Varanasi	
4.	SARITA	2018	VNR Seeds	
5.	HARUNA	2018	VNR Seeds	
6.	Kashi Ganga (C)	-	IIVR, Varanasi	
7.	Arka Bahar (C)	-	IIHR, Bengluru	

Seed quantity : 50g
Seed supply : 30th Oct. (25+3 pkt)
Plot size : 7.5 × 3.0 m
Spacing : 300 × 75 cm
Total Centres : 25
Design : RBD
Replication : 3

6. Bitter gourd Hybrid IET

Sl. No.	Entries	Year	Source	Centres
1.	Pragati-065	2018	East West Seeds	**I :** Pantnagar, DIBER **III:** Nagaland, Barapani **IV:** IIVR, Ludhiana, Allahabad, Ranchi **V:** Bhubaneshwar **VI:** IARI, Hisar, Rahuri **VIII:** Coimbatore
2.	HKH-56	2018	CCSHAU, Hisar	
3.	DBGH-11	2018	IARI, New Delhi	
4.	DBGH-26	2018	IARI, New Delhi	
5.	Akash	2018	VNR,Seeds	
6.	Sunny	2018	VNR,Seeds	
7.	Pusa Hybrid-2 (C)	-	IARI, New Delhi	
8.	NBGH-167(C)	-	Nirmal seeds	
9.	Vivek (C)	-	Sungro seeds	

Seed quantity : 50g
Seed supply : 30th Oct. (13+3 pkt)
Plot size : 7.5 × 3.0 m
Spacing : 150 × 75 cm
Total Centres : 13
Design : RBD
Replication : 3

7. Ridge gourd Hybrid IET

Sl. No.	Entries	Year	Source	Centres
1.	DRGH-8	2018	IARI, New Delhi	**IV:** Ludhiana, IIVR, Sabour, Kalyanpur, Ranchi, Allahabad **V:** Bhubaneswar (OUAT), Hyderabad **VI:** IARI, Junagadh, Anand, Durgapura, CIAH **VIII:** IIHR, Coimbatore, Karikal
2.	Aarti	2018	VNR Seeds	
3.	VRRGH-1	2018	IIVR, Varanasi	
4.	VRRGH-2	2018	IIVR, Varanasi	
5.	Kashi Shivani (C)	-	IIVR, Varanasi	
6.	Pusa Nasdaar (C)	-	IARI, New Delhi	
7.	Pusa Nutan (C)	-	IARI, New Delhi	

Seed quantity : 50g
Seed supply : 30th Oct.(16+3 pkt)
Plot size : 7.5 × 3.0 m
Spacing : 150 × 75 cm
Total Centres : 16
Design : RBD
Replication : 3

8. Sponge gourd hybrid IET

Sl. No.	Entry	Year	Source	Centres
1.	DSGH-95	2018	IARI, New Delhi	**IV:** Ludhiana, IIVR, Sabour, Kalyanpur, Ranchi, Allahabad **V:** Bhubaneswar (OUAT), Hyderabad **VI:** IARI, Junagadh, Anand, Durgapura, CIAH **VIII:** Coimbatore, Karikal
2.	VRSGH-4	2018	IIVR, Varanasi	
3.	VRSGH-5	2018	IIVR, Varanasi	
4.	Alok	2018	VNR Seeds	
5.	Kalyanpur Hari Chikani (C)	-	CSAUA&T, Kalyanpur	
6.	VRSGH-1(Kashi Rakshita) (C)	-	IIVR, Varanasi	
7.	VRSG-194 (Kashi Shreya) (C)	-	IIVR, Varanasi	

Seed quantity : 50g
Seed supply : 30th Oct. (15+3 pkt)
Plot size : 7.5 × 3.0 m
Spacing : 150 × 75 cm
Total Centres : 15
Design : RBD
Replication : 3

9. Pumpkin Hybrid IET

Sl. No.	Entry	Year	Source	Centres
1.	PPH-1	2018	PAU, Ludhiana	**IV:** Ludhiana, IIVR, Sabour, Kalyanpur, Faizabad, Ranchi **V:** Hyderabad, Bhubaneswar (OUAT) **VI:** IARI, Durgapura **VII:** Parbhani, Rahuri, Jabalpur, Akola, **VIII:** IIHR, Coimbatore, Karikal
2.	PPH-2	2018	PAU, Ludhiana	
3.	VRPKH-16-06	2018	IIVR, Varanasi	
4.	VNR-16-14	2018	VNR,Seeds	
5.	Kashi Harit OP (C)	-	IIVR, Varanasi	
6.	Pusa Viswash (C)	-	IARI, New Delhi	
7.	Narendra Abhushan (C)	-	NDUAT, Faizabad	

Seed quantity : 100g Total Centres : 17
Seed supply : 30th Oct. (17+3 pkt) Design : RBD
Plot size : 7.5 × 3.0 m Replication : 4
Spacing : 300 × 60 cm

A. <u>AVT-I Trials</u>

1. Brinjal Hybrid Long AVT-I

Sl. No.	Entry	Year	Source	Conducting centres
1.	IVBHL-21	2017	IIVR, Varanasi	**IV:** IIVR, Ludhiana, Sabour, Kalyanpur, Faizabad, Ranchi **VI:** IARI, Junagadh, Durgapura **VII:** Jabalpur, Rahuri, Parbhani
2.	NDBH-14-7	2017	NDUA&T, Faizabad	
3.	PBHL-56	2017	PAU, Ludhiana	
4.	Barak	2017	Camson Seeds Ltd.	
5.	Punjab Sadabahar (OPC)	-	PAU, Ludhiana	
6.	Navina (C)	-	VNR Seeds	
7.	ARBH-786 (C)	-	Ankur Seeds	

Seed quantity : 10g Total Centres : 12
Seed supply : 30th May (12+3 pkt) Design : RBD
Plot size : 4.5 × 3.0 m Replication : 3
Spacing : 75 × 60 cm

2. Brinjal Hybrid Round- AVT-I

Sl. No.	Entry	Year	Source	Conducting centres
1.	IVBHR-17	2017	IIVR, Varanasi	**IV:** IIVR, Ludhiana, Sabour, Kalyanpur, Ranchi **V:** Raipur **VI:** IARI, Junagadh, Hisar **VII:** Rahuri, Jabalpur, Parbhani
2.	DBHR-91	2017	IARI, New Delhi	
3.	DBHR-1011	2017	IARI, New Delhi	
4.	PBHR-44	2017	PAU, Ludhiana	
5.	Krishna	2017	Camson Seeds Ltd.	
6.	JBH-13-06	2017	JAU, Junagadh	
7.	JBH-14-01	2017	JAU, Junagadh	
8.	Pusa Hybrid-6 (C)	-	IARI, New Delhi	
9.	Kashi Sandesh (C)	-	IIVR, Varanasi	
10.	EPH-178 (C)	-	Syngenta Seeds	
11.	Swarna Mani (black) OPC	-	RCER, Ranchi	

Seed quantity : 10g Total Centres : 12
Seed supply : 30th May (12+3 pkt) Design : RBD
Plot size : 4.5 × 3.0 m Replication : 3
Spacing : 75 × 60 cm

3. Tomato Hybrid Determinate AVT-I

Sl.No.	Entry	Year	Source	Conducting centres
1.	NBH- Benaka	2017	Noble Seeds	**I:** Pantnagar, Almora, Jammu, Srinagar (CITH), Pithoragarh **III:** Passighat, Nagaland, Portblair **IV:** IIVR, Ludhiana, Sabour, Kalyanpur, Ranchi **VI:** IARI, Hisar, Durgapura, Junagadh **VII:** Rahuri, Jabalpur, Goa **VIII:** IIHR, Coimbatore
2.	TH-1214	2017	PAU, Ludhiana	
3.	Akashganga	2017	Camson Seeds Ltd.	
4.	Beas	2017	Camson Seeds Ltd.	
5.	BSS-488 (C)	-	Bejo Sheetal Seeds	
6.	Bhagya (C)	-	Nuziveedu Seeds	
7.	KashiAman (OPC)	-	IIVR, Varanasi	

Seed quantity : 10g
Seed supply : 30th May (22+3 pkt)
Plot size : 4.8 × 4.0 m
Spacing : 60 × 50 cm
Total Centres : 22
Design : RBD
Replication : 4

4. Chilli Hybrid/Hot Pepper AVT-I

Sl. No.	Entry	Year	Source	Conducting centres
1.	NCH-3590	2017	Nirmal Seeds	**I:** Srinagar (SKU), Srinagar (CITH), Solan **IV:** IIVR, Ludhiana, Faizabad, Allahabad **V:** Lam, Raipur **VI:** IARI, Hisar, Junagadh, Navsari **VII:** Rahuri, Parbhani, Jabalpur **VIII:** Coimbatore, IIHR, Bagalkot (UHS)
2.	NBH-Sindoora (Byadagi)	2017	Noble Seeds	
3.	Arka Khyathi	2017	IIHR, Bangaluru	
4.	Arka Haritha	2017	IIHR, Bangaluru	
5.	Arka Sweta	2017	IIHR, Bangaluru	
6.	Pennar	2017	Camson Seeds Ltd.	
7.	Gomti	2017	Camson Seeds Ltd.	
8.	BSS-453 (C)	-	Bejo Sheetal	
9.	ARCH-228 (C)	-	Ankur	
10.	Kashi Anmol (OPC)	-	IIVR	

Seed quantity : 10g
Seed supply : 30th May (16+3 pkt)
Plot size : 4.2 × 3.5 m
Spacing : 60 × 50 cm
Total Centres : 19
Design : RBD
Replication : 3

5. Okra Hybrid (YVMV) AVT-I

Sl. No.	Entries	Year	Source	Conducting centre
1.	OKMSH-3	2017	IIHR, Bangaluru	**IV:** IIVR, Sabour, Ludhiana, Ranchi, Faizabad, Kalyanpur **V:** Bhubaneshwar, Raipur, Lam **VI:** IARI, Navsari, Durgapura, Junagadh **VII:** Jabalpur, Rahuri, Akola, Parbhani **VIII:** IIHR, Coimbatore
2.	DOH-2	2017	IARI, New Delhi	
3.	MYNA-24	2017	Nuziveedu seeds	
4.	VROH-11	2017	IIVR, Varanasi	
5.	Nandi	2017	Camson Seeds Ltd.	
6.	Satlaj	2017	Camson Seeds Ltd.	
7.	Kashi Kranti (C)	-	IIVR, Varanasi	
8.	A. Anamika (C)	-	IIHR, Bangaluru	
9.	Pusa Sawani (C)	-	IARI, New Delhi	
10.	NBH-180 (C)	-	Nuziveedu Seeds	

Seed Quantity : 100g
Seed supply : 30th May (19+3 pkt.)
Plot size : 3.0 × 2.7 m
Spacing : 60 × 30 cm
Total centres : 19
Design : RBD
Replications : 4

6. Watermelon Hybrid AVT-I

Sl. No.	Entries	Year	Source	Conducting centre
1.	NWMH-354	2017	Nirmal Seeds	**IV:** IIVR, Sabour, Ludhiana, Ranchi **VI:** IARI, Navsari, Durgapura, Junagadh **VII:** Jabalpur, Rahuri, Akola **VIII:** IIHR, Bagalkot (UHS), Coimbatore, Vellanikkara
2.	NBH- Krishna	2017	Noble Seeds	
3.	Rambo	2017	Nuziveedu Seeds	
4.	New Netravati	2017	Camson Seeds Ltd.	
5.	Chandraprabhavati	2017	Camson Seeds Ltd.	
6.	Arka Manik (C)	-	IIHR, Bangaluru	
7.	Arka Jyoti (C)	-	IIHR, Bangaluru	
8.	Sugar Baby (C)	-	IARI, New Delhi	

Seed quantity : 50g
Seed supply : 30th Oct. (10+3 pkt)
Plot size : 7.5 × 3.0 m
Spacing : 150 × 75 cm
Total Centres : 15
Design : RBD
Replication : 3

7. Muskmelon Hybrid AVT-I

Sl. No.	Entries	Year	Source	Conducting centre
1.	DMH-5	2017	IARI, New Delhi	**IV:** IIVR, Sabour, Ludhiana, Ranchi **VI:** IARI, Navsari, Durgapura, Hisar **VII:** Jabalpur, Rahuri, Akola **VIII:** IIHR, Coimbatore
2.	DMH-11	2017	IARI, New Dehli	
3.	NMMH-24	2017	Nirmal Seeds	
4.	MH-27	2017	PAU, Ludhiana	
5.	Punjab Hybrid (C)	-	PAU, Ludhiana	
6.	Kashi Madhu (C)	-	IIVR, Varanasi	

Seed quantity : 50g
Seed supply : 30th Oct. (10+3 pkt)
Plot size : 7.5 × 3.0 m
Spacing : 150 × 75 cm
Total Centres : 13
Design : RBD
Replication : 4

8. Bottle gourd Hybrid AVT-I

Sl. No.	Entries	Year	Source	Conducting centre
1.	NBH- Bandhu	2017	Noble Seeds	**I:** Srinagar, Pithoragarh **IV:** IIVR, Faizabad, Kalyanpur, Sabour, Ludhiana **VI:** IARI, Navsari **VIII:** IIHR
2.	BRBGH-1	2017	BAU, Sabour	
3.	BRBGH-2	2017	BAU, Sabour	
4.	VRBGH-2	2017	IIVR, Varanasi	
5.	Brahmaputra	2017	Camson Seeds Ltd.	
6.	Narendra Kamna	2017	NDUA&T, Faizabad	
7.	NDBGH-4 (C)	-	NDUA&T, Faizabad	
8.	Santosh (C)	-	Krishdhan Seeds	
9.	Kashi Ganga (C)	-	IIVR, Varanasi	

Seed quantity : 50g
Seed supply : 30th Oct. (10+3 pkt)
Plot size : 7.5 × 3.0 m
Spacing : 300 × 75 cm
Total Centres : 10
Design : RBD
Replication : 3

9. Bitter gourd Hybrid AVT-I

Sl. No.	Entries	Year	Source	Conducting centre
1.	NBH- Archana	2017	Noble Seeds	**I:** Srinagar, Pithoragarh **IV:** IIVR, Sabour, Ludhiana, Faizabad, Kalyanpur **VI:** IARI, Navsari **VIII:** IIHR
2.	NHBI- 2595	2017	Nuziveedu Seeds	
3.	Lohit	2017	Camson Seeds Ltd.	
4.	Tunga	2017	Camson Seeds Ltd.	
5.	DBGH 21	2017	IARI, New Delhi	
6.	DBGH-542	2017	IARI, New Delhi	
7.	Pusa Hybrid-2 (C)	-	IARI, New Delhi	
8.	NBGH-167 (C)	-	Nirmal Seeds	
9.	Vivek (C)	-	Sungro Seeds	

Seed quantity : 50g
Seed supply : 30th Oct. (10+3 pkt)
Plot size : 7.5 × 3.0 m
Spacing : 150 × 75 cm
Total Centres : 10
Design : RBD
Replication : 3

10. Ridge gourd Hybrid AVT-I

Sl. No.	Entries	Year	Source	Conducting centre
1.	NBH- Raveena	2017	Noble Seeds	**I:** Srinagar, Pithoragarh **IV:** Allahabad, IIVR, Sabour, Ludhiana, Faizabad, Kalyanpur V: Hyderabad **VI:** IARI, Navsari, Junagadh **VIII:** IIHR, Coimbatore
2.	DRGH-4	2017	IARI, New Delhi	
3.	Arka Vikram	2017	IIHR, Bangaluru	
4.	Kauveri	2017	Camson Seeds Ltd.	
5.	Pusa Nasdar (C)		IARI, New Delhi	
6.	Pusa Nutan (C)	-	IARI, New Delhi	

Seed quantity : 50g
Seed supply : 30th Oct. (14+3 pkt)
Plot size : 7.5 × 3.0 m
Spacing : 150 × 75 cm
Total Centres : 14
Design : RBD
Replication : 3

11. Cucumber Hybrid AVT-I

Sl. No	Entries	Year	Source	Conducting centres
1.	DGCH-56	2017	IARI, New Delhi	**I:** Pantnagar, Srinagar (SKU), Solan, Palampur **IV:** IIVR, Sabour, Ranchi, Ludhiana **VI:** IARI, Durgapura, Junagadh **VII:** Rahuri, Parbhani, Jabalpur **VIII:** IIHR, Vellanikkara, Coimbatore
2.	NCUH-1176	2017	Nuziveedu Seeds	
3.	Meghana	2017	Camson Seeds Ltd.	
4.	VRCUH-1	IIVR	IIVR, Varanasi	
5.	Hybrid No.1 (C)	-	Century Seeds	
6.	PCUCH-3(C)	-	GBPUA&T, Pantnagar	

Seed quantity : 25g
Seed supply : 30th Oct. (17+3 pkt)
Plot size : 4.5 × 3.0 m
Spacing : 150 × 50 cm
Total Centres : 17
Design : RBD
Replication : 3

B. AVT-II Trials

1. Brinjal Hybrid Long AVT-II

Sl. No.	Entry	Year	Source	Conducting centres
1.	NBH 1772	2016	Nirmal Seeds	**IV:** IIVR,Ludhiana, Sabour, Kalyanpur, Faizabad, Ranchi **VI:** IARI, Junagadh, Durgapura, Hisar **VII:** Jabalpur, Rahuri, Parbhani
2.	BRBLH-01	2016	Sabour	
3.	PBHL-55	2016	Ludhiana	
4.	IVBHL-20	2016	IIVR	
5.	Punjab Sadabahar (OPC)	-	Ludhiana	
6.	Navina (C)	-	VNR Seeds	
7.	ARBH-786 (C)	-	Ankur	

Seed quantity : 10g
Seed supply : 30th May
Plot size : 4.5 × 3.0 m
Spacing : 75 × 60 cm
Total Centres : 13
Design : RBD
Replication : 3

2. Brinjal Hybrid Round AVT-II

Sl. No.	Entry	Year	Source	Conducting centres
1.	PBHR-43	2016	Ludhiana	**IV:** IIVR,Ludhiana, Sabour, Kalyanpur, Ranchi **V:** Raipur, Bhubaneswar (OUAT), Lam **VI:** IARI, Junagadh, Hisar **VII:** Rahuri, Jabalpur, Parbhani
2.	NBH 1641	2016	Nirmal Seed	
3.	IVBHR-16	2016	IIVR	
4.	DBHR-112	2016	IARI	
5.	DBHR-190	2016	IARI	
6.	Pusa Hybrid-6 (C)	-	IARI	
7.	Kashi Sandesh (C)	-	IIVR	
8.	EPH-178(C)	-	Syngenta	
9.	Swarna Mani (black) OPC	-	RCER(Ranchi)	

Seed quantity : 10g
Seed supply : 30th May
Plot size : 4.5 × 3.0 m
Spacing : 75 × 60 cm
Total Centres : 14
Design : RBD
Replication : 3

3. Tomato Hybrid Det. AVT-II

Sl. No.	Entry	Year	Source	Conducting centres
1.	TMTH 222	2016	Trimurti Plant Sci.	**I:** Pantnagar, Srinagar (SKU), Almora, Jammu, Srinagar (CITH), Pithoragarh **III:** Passighat,Nagaland, Portblair **IV:** IIVR, Ludhiana, Sabour, Kalyanpur, Ranchi **VI:** IARI, Hisar, Durgapura, Junagadh **VII:** Rahuri, Jabalpur, Goa **VIII:** IIHR, Coimbatore,Bagalkot (UHS)
2.	Ranjitha (041)	2016	Metahelix	
3.	NTH-3622	2016	Nirmal Seeds	
4.	NTH-1894	2016	Nath Bio Genes	
5.	BSS-488 (C)	-	BejoSheetal	
6.	Bhagya (C)	-	Nuziveedu Seeds	
7.	KashiAman (OPC)	-	IIVR	

Seed quantity : 10g
Seed supply : 30th May
Plot size : 4.8 × 4.0 m
Spacing : 60 × 50 cm
Total Centres : 24
Design : RBD
Replication : 3

4. Chilli Hybrid/Hot Pepper AVT-II

Sl. No.	Entry	Year	Source	Conducting centres
1.	MH-1201	2016	Metahelix	**I:** Srinagar (SKU), Srinagar (CITH), Solan **IV:** IIVR, Ludhiana, Faizabad,Allahabad **V:** Lam, Bhubaneswar (OUAT), Raipur **VI:** IARI, Hisar, Junagadh, Navsari **VII:** Rahuri, Parbhani, Jabalpur **VIII:** Coimbatore, IIHR, Bagalkot (UHS)
2.	MH-1203	2016	Metahelix	
3.	KHPH-202	2016	Kaveri Seeds	
4.	CCH-11	2016	IIVR	
5.	NCH-1120	2016	Nath Bio Genes	
6.	BSS-453 (C)	-	BejoSheetal	
7.	ARCH-228 (C)	-	Ankur	
8.	KashiAnmol (OPC)	-	IIVR	

Seed quantity : 10g
Seed supply : 30th May
Plot size : 4.2 × 3.5 m
Spacing : 60 × 50 cm
Total Centres : 20
Design : RBD
Replication : 3

5. Cauliflower Hybrid (Early) AVT-II

Sl. No.	Entry	Year	Source	Centres
1.	DCH4198	2016	IARI	**IV:** IIVR, Ludhiana, Sabour, Ranchi **V:**Lam, Raipur, Bhubaneswar (OUAT) **VI:** IARI, Junagadh, Hisar, Durgapura **VII:** Jabalpur, Rahuri, Parbhani
2.	DCH 1467	2016	IARI	
3.	DCH 2398	2016	IARI	
4.	DCH 9867	2016	IARI	
5.	DCH 1523	2016	IARI	
6.	DCH 988	2016	IARI	
7.	Pusa Kartik Sankar (C)	-	IARI	
8.	Pusa Meghna (C)	-	IARI	

Seed quantity : 10g
Seed supply : 30th May
Plot size : 2.25 × 1.20 m
Spacing : 45 × 30 cm
Total Centres : 14
Design : RBD
Replication : 3
Sowing Time : June/July

6. Cauliflower Hybrid (Mid) AVT-II

Sl. No.	Entry	Year	Source	Centres
1.	DCH 2325	2016	IARI	**I:** Solan, Katrain, Srinagar (SKU), Pantnagar (Sowing March-April) **IV:** IIVR, Ludhiana, Sabour, Ranchi **V:** Lam, Raipur, Bhubaneswar (OUAT) **VI:** IARI, Junagadh, Hisar, Durgapura **VII:** Jabalpur, Rahuri, Parbhani
2.	DCH1033	2016	IARI	
3.	DCH 1009	2016	IARI	
4.	DCH4976	2016	IARI	
5.	DCH1476	2016	IARI	
6.	DCH 9476	2016	IARI	
7.	Madhyma	2016	Ananya Seeds	
8.	PH2(C)	-	IARI	
9.	Pusa Shukti(C)	-	IARI	
10.	Pusa Paushja(C)	-	IARI	

Seed quantity : 10g
Seed supply : 30th June
Plot size : 3.00 × 2.0 m
Spacing : 60 × 50 cm
Total Centres : 18
Design : RBD
Replication : 3
Sowing Time: Zone I: March/ April; other Zones : July/August

7. Cucumber Hybrid AVT-II

Sl. No	Entries	Year	Source	Conducting centres
1.	KPCH-1	2016	Vellanikkara	**I:** Pantnagar, Srinagar (SKU), Solan, Palampur **IV:** IIVR, Sabour, Ranchi, Ludhiana **VI:** IARI, Durgapura, Junagadh **VII:** Rahuri, Parbhani, Jabalpur **VIII:** IIHR, Vellanikkara, Coimbatore
2.	DGCH-31	2016	IARI	
3.	DGCH-40	2016	IARI	
4.	PCuCH-5	2016	Pantnagar	
5.	Hybrid No.1 (C)	-	Century	
6.	PCUCH-3 (C)	-	Pantnagar	
7.	Local (C)	-	-	

Seed quantity : 25g
Seed supply : 30th Oct.
Plot size : 4.5 × 3.0 m
Spacing : 100 × 60 cm
Total Centres : 17
Design : RBD
Replication : 3

8. Carrot Hybrid (Tropical) AVT-II

Sl. No.	Entry	Year	Source	Centres
1.	DCatH 1698	2016	IARI	**IV**: IIVR, Ludhiana, Ranchi. **VI:** IARI, Hisar, Durgapura **VII:** Jabalpur, Rahuri, Parbhani **VIII:**IIHR, Bagalkot (UHS), Coimbatore
2.	DcatH 8116	2016	IARI	
3.	DcatH 1353	2016	IARI	
4.	DcatH 9896	2016	IARI	
5.	DcatH 2255	2016	IARI	
6.	Pusa Vasuda (C)	-	IARI	
7.	Pusa Kesar (C)	-	IARI	

Seed quantity : 20g
Seed supply : 30th July
Plot size : 2.40 × 2.50m
Spacing : 40 × 10 cm
Total Centres : 12
Design : RBD
Replication : 3
Sowing Time : September/October

9. Watermelon Hybrid AVT-II

Sl. No.	Entries	Year	Source	Conducting centre
1.	NWMH- 975	2016	Nirmal Seeds	**IV:** IIVR, Sabour, Ludhiana, Ranchi **VI:** IARI, Navsari, Durgapura, Junagadh **VII:** Jabalpur, Rahuri, Akola **VIII:** IIHR, Bagalkot (UHS), Coimbatore, Vellanikkara
2.	NWMH- 945	2016	Nirmal Seeds	
3.	Swarna	2016	Vellanikkara	
4.	Shonima	2016	Vellanikkara	
5.	ArkaManik (C)	-	IIHR	
6.	ArkaJyoti (C)	-	IIHR	
7.	Sugar Baby	-	IARI	

Seed quantity : 50g
Seed supply : 30th Oct.
Plot size : 7.5 × 3.0 m
Spacing : 300 × 60 cm
Total Centres : 15
Design : RBD
Replication : 3

SESSION- V

Evaluation for biotic and abiotic stresses

Chairperson	:	Dr. K.V. Peter, Ex. Vice Chancellor, KAU, Vellanikkara
Co-Chairperson	:	Dr. A.T. Sadashiva, Head, ICAR-IIHR, Bengaluru
Convener	:	Dr. P. Karmakar, Scientist, ICAR-IIVR, Varanasi
Rapporteurs	:	Dr. Arup Chattopadhya, Prof., BCKV, Kalyani
	:	Dr. Vikas Singh, Senior Scientist, ICAR-IIVR, Varanasi

Chairperson in his opening remarks underscored the significance of exploitation of host resistance in vegetable crops. He highlighted the importance of root stock breeding in cucurbitaceous and solaneceous crops. He also emphasized the use of trap crops for promoting organic ecosystem. He emphasized that the programmes on abiotic stresses on different vegetables should also be initiated. The outcome and data of different trials related to disease resistant trials for the years 2016-17 and 2017-18 were reviewed and presented by Dr. T.K. Behera, Principal Scientist, ICAR-IARI, New Delhi.

Following suggestions and views emerged during the discussion

- All the centres should strictly follow the proceedings of Palampur / IIHR Group meeting for conducting trials and data recording for the biotic stresses. It was also suggested to take utmost care in data analysis and verify the discrepancies before reporting.
- PDI/DI without transformed value should not be considered for compilation / documentation.
- Centre should mention type of entry (OP/ Hybrid) at the time of formulation of new trial.
- In case of ToLCV trial, the centre should mention type of *Ty* gene conferring resistance in the particular entry.
- All the participating centers should include susceptible check in the trials as both spreader rows and checks.
- All the trials related to YVMV in okra should be accompanied with the observation on enation leaf curl virus disease incidence. Transformed PDI/DI for ELCV should also be submitted to PC Cell .
- All the centers conducting resistant trials should provide high quality photographs of disease incidence and differential disease response observed in the trials.
- A network project is to be initiated on viral diseases of Tomato, Chilli and Okra.
- Programs on abiotic stresses on different vegetables should be initiated.

In the concluding remarks, the Chairperson emphasized the importance of exploiting wild taxas and suggested that the centers should utilize these resources in resistance breeding programs.

Recommendations

- Chairperson observed that there should be trials on abiotic stresses such as heat tolerance, low and excess moisture stress tolerance keeping in view the climate change scenario.
- It was emphasized that the hybrids and open pollinated varieties should not be evaluated together in a single trial as the yield potential of hybrids/varieties is different.

TECHNICAL PROGRAMME (2018-19)

New Trials to be initiated

1. Okra (YVMV) IET

S. No.	Entries	Year	Source	Centres
1.	BCO-4	2018	BCKV, Kalyani	**I:** Jammu, Pantnagar **II:** Kalyani, Jorhat **IV:** IIVR, Ludhiana, Faizabad, Kalyanpur **V:** Bhubaneshwar, Raipur, Hyderabad, Lam **VI:** IARI, Hisar, Junagadh, Anand, Navsari **VII:** Rahuri, Jabalpur, Parbhani, Akola, Dapoli **VIII:** Coimbatore, IIHR, Vellanikara
2.	AKOV-118	2018	PDKV, Akola	
3.	VRO-110	2018	IIVR, Varanasi	
4.	VRO-119	2018	IIVR, Varanasi	
5.	JOL-14-10	2018	JAU, Junagadh	
6.	Pusa sawani (C)	-	IARI, New Delhi	
7.	Arka Anamika (C)	-	IIHR, Bengaluru	
8.	Kashi Kranti (C)	-	IIVR, Varanasi	

Seed Quantity : 100g
Seed supply : 30th May(25+3 pkt)
Plot size : 3.0 × 2.7 m
Spacing : 60 × 30 cm
Total centres : 25
Design : RBD
Replications : 3

2. Tomato (ToLCV) IET

Sl. No.	Entries	Year	Source	Centres
1.	IIHR -391	2018	IIHR, Bengaluru	**II:** Kalyani **IV:** IIVR, Ludhiana, Ranchi, RAU Pusa **V:** Raipur, Hyderabad, Bhubaneswar (OUAT) **VI:** IARI, Junagadh, Hisar **VIII:** IIHR, Coimbatore, Bagalkot (UHS)
2.	IIHR -385	2018	IIHR, Bengaluru	
3.	VRT-28	2018	IIVR, Varanasi	
4.	Pusa ToLCV Hyb-3	2018	IARI, New Delhi	
5.	Pusa ToLCV Hyb-6	2018	IARI, New Delhi	
6.	Kashi Aman (C)	-	IIVR, Varanasi	
7.	Punjab Chhuara (C)	-	PAU, Ludhiana	

Seed Quantity : 10g
Seed supply : 30th May(14+3 pkt)
Plot size : 4.8 × 4.0 m
Spacing : 60 × 50 cm
Total centres : 14
Design : RBD
Replications : 3

A. AVT-I Trials

1. Okra (YVMV) AVT-I

S. No.	Entries	Year	Source	Centres
1.	BRO-01	2017	BAU, Sabour	**I:** Pantnagar, Palampur, Jammu **II:** Kalyani **IV:** IIVR, Ludhiana, Faizabad, Kalyanpur, Sabour **V:** Bhubaneswar, Raipur, Hyderabad, Lam **VI:** IARI, Hisar, Junagadh, Anand, Navsari
2.	VRO-111	2017	IIVR, Varanasi	
3.	GK-4	2017	MPKV, Rahuri	
4.	Punjab Suhawani	2017	PAU, Ludhiana	
5.	Palam Komal	2017	CSK HPKV, Palampur	
6.	AKOV-117	2017	PDKV, Akola	
7.	Pusa Sawani (SC)	-	IARI, New Delhi	

S. No.	Entries	Year	Source	Centres
8.	A. Anamika (C)	-	IIHR, Bengaluru	**VII:** Rahuri, Jabalpur, Parbhani, Akola, Dapoli **VIII:** Coimbatore, IIHR, Vellanikkara
9.	Kashi Kranti (C)	-	IIVR, Varanasi	

Seed Quantity : 100g
Seed supply : 30th May (26+3 pkt.)
Plot size : 3.0 × 2.7 m
Spacing : 60 × 30 cm
Total centres : 26
Design : RBD
Replications : 4

B. AVT-II Trials

1. Tomato (ToLCV) AVT-II

Sl. No.	Entries	Year	Source	Centres
1.	BCT-25	2016	Kalyani	**II:** Kalyani **IV:** IIVR, Ludhiana,Ranchi **V:** Raipur, Hyderabad, Bhubaneswar (OUAT) **VI:** IARI, Junagadh, Hisar **VIII:** IIHR, Coimbatore, Bagalkot (UHS)
2.	IIHR-369	2016	IIHR	
3.	IIHR-371	2016	IIHR	
4.	VRToLCV-32	2016	IIVR	
5.	H-24 (C)	-	IIVR	
6.	Kashi Aman (RC)	-	IIVR	
7.	Pb. Chhuhara (SC)	-	Ludhiana	

Seed Quantity : 10g
Seed supply : 30th May
Plot size : 4.8 × 4.0 m
Spacing : 60 × 50 cm
Total centres : 13
Design : RBD
Replications : 3

2. Brinjal (Bacterial Wilt) AVT-II

Sl. No.	Entries	Year	Source	Centres
1.	CARI Brinjal 1	2016	Portblair	**II:** Kalyani **III:** Tripura, Portblair, Passighat, Barapani **V:** Hyderabad, Bhubaneswar (OUAT) **VI:** IARI, Hisar **VII:** Rahuri, Goa, Akola **VIII:** IIHR, Vellanikkara, Bagalkot (UHS)
2.	IIHR-37-36-4-20 (Arka Avinash)	2016	IIHR	
3.	IIHR-37-36-4-16 (Arka Unnathi)	2016	IIHR	
4.	BB-67	2016	Bhubaneshwar	
5.	SM-6-7 (RC)	-	Vellanikkara	
6.	Arka Nidhi (RC)	-	IIHR	
7.	Arka Kusmaker (SC)	-	IIHR	
8.	PPL (SC)	-	IARI	

Seed Quantity : 10g
Seed supply : 30th May
Plot size : 4.5 × 4.2 m
Spacing : 75 × 60 cm
Total centres : 15
Design : RBD
Replications : 3

SESSION- VI

Vegetable Production

Chairperson	:	Dr. Kirti Singh, Ex. Chairman, ASRB
Co- Chairperson	:	Dr. S.K. Sharma, Dean, College of Agri., Sikkim
		Dr. Gopal Lal, Director, Ajmer
Convener	:	Dr. S.K. Singh, Principal Scientist, ICAR-IIVR
Rapporteur	:	Dr. S.K. Singh, Principal Scientist, ICAR-IIVR
		Dr. Nirmala Devi, KAU

Chairman in his opening remarks emphasized the importance of production technologies for enhancing the input use efficiency, production of safe vegetables and enhancing vegetable production. Co-chairman emphasized use of herbicides for the management of weeds. He also suggested to include some more experiments on grafting in Solanaceous vegetables as well as some Cucurbits for the management of biotic and abiotic stresses. Thereafter he invited the following scientists for presenting the results of the trials being conducted on Crop Production:

1. Dr. Nirmala Devi- IPNM and Micronutrient Trials
2. Dr. S. K. Singh- Organic farming, Drip Irrigation and Mulching Trials
3. Dr. Rajshree- Weed Management and Grafting Trials.

The presentations were followed by discussions and then a committee was constituted by the Chairman to finalize the recommendation from the results presented for the year 2016-17 and 2017-18 and also to formulate the technical programme for the year 2018-19.

1. Dr. Jagdish Singh-Chairman
2. Dr. S. K. Singh
3. Dr. Nirmala Devi
4. Dr. Rajshree
5. Dr. V. Kanthaswamy
6. Dr. Kulbir Singh
7. Dr. Yashwant Kumar

Following points were suggested for improvement of the programme:

1. The trials under Crop Production were not conducted at Sabour during 2016-17 and 2017-18 due to absence of Agronomist in the programme. Chairman suggested that this may be brought to the notice of Director Research and Vice Chancellor of BAU, Sabour, so that a staff may be deputed for conducting trials.
2. The name of the variety, sowing and harvesting time should also be mentioned in the result.
3. In spite of repeated recommendations in the group meeting, many of the centers have not given the economics /Benefit: Cost ratio of the treatments. This should be strictly adhered in all the production trials.
4. The agronomy or production technology should be developed on the recommended varieties of the region. If no recommended variety is available then leading variety of the region/area may be taken.
5. The result of a particular trial conducted at different centers should be presented together for comparison of the treatments.

6. The trials which have been conducted for three years, the results may be pooled to give proper recommendations with the B: C ratio.
7. Grafting trials may be taken in other crops at more number of centers.
8. The vegetable type genotypes in coriander and fenugreek may be shared with NRCSS, Ajmer.
9. There is a need to establish critical stages/ period of weed control in vegetable crops to reduce the cost on weed management.
10. Drip irrigation trials have given good result. Emphasis may be given for its implementation in the field.

Recommendations (2016-17)

Drip Irrigation Studies

1. Under the tropical sub humid laterite soil of Kerala, irrigation at 0.5 bar along with black polythene mulch gave highest yield (387.5q/ha), and B:C ratio (1.9) in oriental pickling melon**.**
2. 100% application of water soluble fertilizers (18:18:18 NPK) through drip irrigation in hybrid chilli var. Kashi Surkh, recorded the maximum fruit yield of 110.33q/ha with maximum B: C ratio of 2.35 under Varanasi condition.

Weed Management Studies

3. Mulching with black-silver polythene (double coated 30 micron) recorded maximum green chilli yield of 119.34 q/ha and 87.7 q/ha with maximum B: C ratio of 1.40 and 1.82 in chilli varieties cv. Kashi Tej and Kashi Anmol respectively at Varanasi and Hisar condition. However, at Ludhiana the same treatment recorded highest yield of 317.9 q/ha with B:C ratio of 3.05.
4. Pre-emergence application of pendimethalin @ 6ml/L + one hand weeding at 35 days after sowing gave maximum fruit yield of 81.26 q/ha with highest B: C ratio 2.48 in Okra cv. Arka Anamika under, Kalyanpur condition.

Recommendations (2017-18)

Integrated Nutrient Management

1. Application of Vermicompost @ 2.5t/ha + 1/2 recommended dose of NPK (150:50:100 kg/ha) gave maximum yield (164.56 q/ha) with maximum B:C ratio of 3.16 in broccoli under Bhubaneswar condition.

Organic Trials

2. Application of Vermicompost @ 5 t ha^{-1} + PSB + *Azospirillum* (each 5 kg ha^{-1}) gave maximum fresh leaf yield (145.93 q/ha) in amaranth, however the highest net return (Rs. 1,58,860) and maximum B:C ratio (3.38) was recorded with application of FYM 20 t ha^{-1} + PSB + *Azospirillum* (each 5 kg ha^{-1}) under Nagaland condition.

Weed Management

3. Pre emergence application of Pendimethalin @ 6 ml/L along with one hand weeding gave highest okra yield (129.5 q/ha) with highest benefit: cost ratio of 1.61 under Ludhiana condition.

Technical Programme 2018-19

	Integrated Nutrient Management (INM) studies			
1.	INM in cucumber	5.15.4	Junagadh, Bhubaneswar, Jorhat	3
2.	INM in bitter gourd	5.15.6	Vellanikara,	1
3.	INM in broccoli	5.15.8	Nagaland	1
4.	INM studies in French bean (2017-18)	5.42	IIVR, Srinagar, Solan, Nagaland, Kalyanpur, Jabalpur, Jorhat, (2018-19) Bhubneshwar, Hisar, Hyderabad , Raipur	11
	Micronutrient studies			
5.	Response of tomato to foliar application of micronutrients	5.18.1	NHRDF, IIVR, Srinagar	1
6.	Response of bitter gourd to foliar application of micronutrients	5.18.4	(2018-19) Dharwad, Kalayanpur, Raipur, Hyderabad	4
	Organic trials			
7.	Organic farming in okra, tomato and cowpea	5.26	Jorhat	1
8.	Organic production of amaranthus	5.26.1	Karaikal, (2018-19)-Dharwad	2
9.	Organic production of spinach beet	5.26.2	Srinagar, Nagaland, Kalyanpur	3
10.	Organic farming in coriander – radish sequence	5.26.3	Bhubaneshwar, Dharwad, IIVR, Durgapura, Karaikal, Kalyanpur (2018-19) Nagaland	7
	Drip irrigation studies			
11.	Enhancing water productivity by drip irrigation and mulching in vegetables	5.32	Chitrakoot (2018-19) Ludhiana	2
12.	Studies on drip fertigation in hybrid chilli	5.36	Pantnagar	1
13.	Drip irrigation and mulching in okra	5.38	Vellanikara, IIVR	2
	Weed management studies			
14.	Weed control in cowpea during kharif season	5.35	IIVR, Pasighat, (2018-19)-Hisar, Ludhiana, Kalyanpur, Raipur	6
15.	Effect of mulch on weed density, yield and quality of chilli (Trials concluded)	5.37	Ludhiana, Hisar, IIVR	
16.	Weed management in okra	5.40	Vellanikara, IIVR, IIHR, Nagaland, Jorhat, Srinagar, Bhubaneshwar, (2018-19)- Hisar Dharwad, Hyderabad	10

	Grafting trials			
17.	Grafting studies in brinjal for the management of soil borne diseases and nematode	5.41	IIHR, IIVR, Dharwad, Coimbatore, Ludhiana, Vellanikara, Cooch Bihar, Jorhat (2018-19) Raipur	09
			TOTAL	**66**

Veg. 5.15.4. Integrated nutrient management in cucumber

Centers allotted: Junagardh, Bhubaneswar, Jorhat (03)

Treatment No.	Treatment Detail
T_1	FYM @ 20 t/ha
T_2	Vermicompost @ 4 t/ha
T_3	Recommended NPK through fertilizers
T_4	FYM @ 10 t/ha + Bio fertilizer
T_5	Vermicompost @ 2 t/ha + Bio fertilizers
T_6	Half recommended NPK + Bio fertilizers
T_7	Half recommended NPK + Vermicompost @ 2 t/ha + Bio fertilizers
T_8	Half recommended NPK + FYM @ 10 t/ha + Bio fertilizers
T_9	Recommended NPK + FYM @ 10 t/ha + Bio fertilizers
T_{10}	Recommended NPK + Vermicompost @ 2 t/ha + Bio fertilizers
T_{11}	Half recommended NPK + FYM @ 10 t/ha + Vermicompost @ 2 t/ha + Bio fertilizers

	1.	Center:	:		2.	Season	:	
	3.	Design of experiment	:		4.	Replication	:	
	5.	Gross plant size	:	m^2	6.	Net plat size	:	m^2
	7.	Date of sowing/transplant	:		8.	Date of Harvesting	:	
	9.	Variety	:		10.	Spacing	:	
	11.	Fertilizer dose	:					

12. Initial soil fertility:

PH	OC (%)	Available N (kg/ha)	Available P_2O_5 (kg/ha)	Available K_2O (kg/ha)

Treatment	Plant stand/plant emergence (%)	Days to first fruit harvest	Number of fruits/Plant (Average of five plants/plot)	Average fruit weight (g) (2nd & 3rd Picked fruits and average of 10 fruits)	Marketable Yield /plant (kg) (average of five plants / plot)	Total Marketable yield /plot (Kg)	Soil Fertility status at the end of experiment			Economics of production.							
										Cost of cultivation			Sale price coriander (Rs)	Sale price radish (Rs)	Gross return (Rs)	Net return (Rs)	B:C ratio
							N (kg/ha)	Phosphorous (kg /ha)	Potassium (kg/ha)	Fertilizer cost (Rs)	Other cost(Rs)	Total cost (Rs)					
	13	14	15	16	17	18	19	20	21	22	24	25	26	27	28	29	30
T_1																	

T_2																	

T_{11}																	
CD (P=0-05)																	
CV %																	

Veg. 5.15.6. Integrated nutrient management in bottle gourd

Centers allotted: Vellanikara (01)

Treatment No.	**Treatment Detail**
T_1	FYM @ 20 t/ha
T_2	Vermicompost @ 4 t/ha
T_3	Recommended NPK through fertilizers
T_4	FYM @ 10 t/ha + Bio fertilizer
T_5	Vermicompost @ 2 t/ha + Bio fertilizers
T_6	Half recommended NPK + Bio fertilizers
T_7	Half recommended NPK + Vermicompost @ 2 t/ha + Bio fertilizers
T_8	Half recommended NPK + FYM @ 10 t/ha + Bio fertilizers
T_9	Recommended NPK + FYM @ 10 t/ha + Bio fertilizers
T_{10}	Recommended NPK + Vermicompost @ 2 t/ha + Bio fertilizers
T_{11}	Half recommended NPK + FYM @ 10 t/ha + Vermicompost @ 2 t/ha + Bio fertilizers
CD(P=0-05)	
CV(%)	

1.	Center:	:		2.	Season	:	
3.	Design of experiment	:		4.	Replication	:	
5.	Gross plant size	:	m^2	6.	Net plat size	:	m^2
7.	Date of sowing/transplant	:		8.	Date of Harvesting	:	
9.	Variety	:		10.	Spacing	:	
11.	Fertilizer dose	:					

12. Initial soil fertility:

PH	OC (%)	Available N (kg/ha)	Available P_2O_5 (kg/ha)	Available K_2O (kg/ha)

Treatment	Plant stand/plant emergence (%)	Days to first fruit harvest	Number of fruits/Plant (Average of five plants/plot)	Average fruit weight (g) (2nd & 3rd Picked fruits and average of 10 fruits)	Marketable Yield /plant (kg) (average of five plants / plot)	Total Marketable yield /plot (Kg)	Soil Fertility status at the end of experiment			Economics of production.							
										Cost of cultivation			Sale price coriander (Rs)	Sale price radish (Rs)	Gross return (Rs)	Net return (Rs)	B:C ratio
							N (kg/ha)	Phosphorous (kg /ha)	Potassium (kg/ha)	Fertilizer cost (Rs)	Other cost(Rs)	Total cost (Rs)					
	13	14	15	16	17	18	19	20	21	22	24	25	26	27	28	29	30

T_1																	
T_2																	

T_{11}																	
CD (P=0-05)																	
CV %																	

5.15.8 Integrated nutrient management in Broccoli

Centers allotted: Vellanikara (01)

Treatment No.	Treatment Detail
T_1	Full dose of NPK through chemical fertilizer
T_2	FYM @ 20t/ha
T_3	FYM @10t/ha +half NPK through fertilizer
T_4	Neem Cake @5q/ha
T_5	Neem Cake @ 2.5q/ha +half NPK through fertilizer
T_6	Vermicompost @5t/ha
T_7	Vermicompost @2.5t/ha+half NPK through fertilizer
T_8	Poultry manure @ 5t/ha
T_9	Poultry manure @ 2.5t/ha+half NPK through fertilizer
CD(P=0-05)	
CV(%)	

1.	Center:	:		2.	Season	:	
3.	Design of experiment	:		4.	Replication	:	
5.	Gross plant size	:	m^2	6.	Net plat size	:	m^2
7.	Date of sowing/transplant	:		8.	Date of Harvesting	:	
9.	Variety	:		10.	Spacing	:	
11.	Fertilizer dose	:					

12. Initial soil fertility:

PH	OC (%)	Available N (kg/ha)	Available P_2O_5 (kg/ha)	Available K_2O (kg/ha)

Treatment	Plant stand (%)	Days to fruit maturity	Average marketable curd weight. (g) (Average of 5 plants)	Marketable curd Yield /plot (kg)	Gross whole plant weight (Kg)(average of five plants)	Soil Fertility status at the end of experiment			Economics of production.							
									Cost of cultivation							
						N (kg/ha)	Phosphorous (kg /ha)	Potassium (kg/ha)	Fertilizer cost (Rs)	Other cost(Rs)	Total cost (Rs)	Sale price coriander (Rs)	Sale price radish (Rs)	Gross return (Rs)	Net return (Rs)	B:C ratio
	13	14	15	16	17	18	19	20	21	22	24	25	26	27	28	29
T_1																

T_2																

T_9																
CD (P=0-05)																
CV %																

Veg. 5.42: Integrated Nutrient Management in French bean

Centre – IIVR, Srinagar, Solan, Nagaland, Kalyanpur, Samastipur, Jabalpur, Jorhat (2018-19) Bhubaneshwar, Hisar, Hyderabad, Raipur (12)

Treatment	
T_1	100% NPK through inorganic source
T_2	75% NPK through inorganic + 25% N through FYM
T_3	75% NPK through inorganic + 25% N through Vermicompost
T_4	50% NPK through inorganic + 50% N through FYM
T_5	50% NPK through inorganic + 50% N through Vermicompost
T_6	25% NPK through inorganic + 75% N through FYM
T_7	25% NPK through inorganic + 75% N through Vermicompost
T_8	Control no fertilizer

1.	Center:	:		2.	Season	:	
3.	Design of experiment	:		4.	Replication	:	
5.	Gross plant size	:	m^2	6.	Net plat size	:	m^2
7.	Date of sowing/transplant	:		8.	Date of Harvesting	:	
9.	Variety	:		10.	Spacing	:	
11.	Fertilizer dose	:					

12. Initial soil fertility:

PH	OC (%)	Available N (kg/ha)	Available P_2O_5 (kg/ha)	Available K_2O (kg/ha)

Treatment	Plant stand (%)	Days to first pod harvest	Number of pods/Plant (Average of five plants / plot)	Average pod weight (g) (2nd & 3rd Picked pods and average of 10 pods)	Marketable Yield /plant (kg) (average of five plants/plot)	Total Marketable yield /plot (Kg)	Soil Fertility status at the end of experiment			Economics of production.							
										Cost of cultivation			Sale price coriander (Rs)	Sale price radish (Rs)	Gross return (Rs)	Net return (Rs)	B:C ratio
							N (kg/ha)	Phosphorous (kg /ha)	Potassium (kg/ha)	Fertilizer cost (Rs)	Other cost(Rs)	Total cost (Rs)					
	13	14	15	16	17	18	19	20	21	22	24	25	26	27	28	29	30
T_1																	
T_2																	

T_8																	

CD (P=0-05)																	
CV %																	

Veg. 5.18.1 Response of tomato to foliar application of micronutrients

Centre – NHRDF, IIVR, Srinagar, Solan, Nagaland, Kalyanpur, Jabalpur, Jorhat

	Treatment	**Chemical**	**Quantity(ppm)**
T_0	Control		
T_1	Boric acid	B	100(0.571 g/l)
T_2	Zinc sulphate	Zn	100(0.246 g/l)
T_3	Ammonium molybdate	Mo	50(0.644 g/l)
T_4	Copper sulphate	Cu	100(0.52 g/l)
T_5	Ferrous sulphate	Fe	100(0.515 g/l)
T_6	Manganese sulphate	Mn	100(0.32g/l)
T_7	Mixture of all		
T_8	Mixture of all without B		
T_9	Mixture of all without Zn		
T_{10}	Mixture of all without Mo		
T_{11}	Mixture of all without Cu		
T_{12}	Mixture of all without Fe		
T_{13}	Mixture of all without Mn		
T_{14}	Commercial formulation		

1.	Center:	:		2.	Season	:	
3.	Design of experiment	:		4.	Replication	:	
5.	Gross plant size	:	m^2	6.	Net plat size	:	m^2
7.	Date of sowing/transplant	:		8.	Date of Harvesting	:	
9.	Variety	:		10.	Spacing	:	
11.	Fertilizer dose	:					

12. Initial soil fertility:

PH	OC (%)	Available N (kg/ha)	Available P_2O_5 (kg/ha)	Available K_2O (kg/ha)

Treatment	Plant stand (%)	Days to first fruit harvest	Number of fruits/Plant (Average of five plants / plot)	Average fruit weight (g) (2nd & 3rd Picked pods and average of 10 pods)	Marketable Yield /plant (kg) (average of five plants/plot)	Total Marketable yield /plot (Kg)	Soil Fertility status at the end of experiment			Economics of production.							
										Cost of cultivation			Sale price coriander (Rs)	Sale price radish (Rs)	Gross return (Rs)	Net return (Rs)	B:C ratio
							N (kg/ha)	Phosphorous (kg /ha)	Potassium (kg/ha)	Fertilizer cost (Rs)	Other cost(Rs)	Total cost (Rs)					
	13	14	15	16	17	18	19	20	21	22	24	25	26	27	28	29	30
T_1																	
T_2																	

T_{14}																	
CD (P=0-05)																	
CV %																	

Veg. 5.26 Organic farming in Okra, Tomato and Cowpea

Centre: Sabour, Dharwad, Jorhat

Treatment	
T_1	FYM @ 20 t/ha
T_2	Vermicompost @ 5 t/ha
T_3	Neem cake @ 2 t/ha
T_4	FYM @ 10 t/ha + Vermicompost @ 2.5 t/ha
T_5	FYM @ 10 t/ha + Neem cake @ 1 t/ha
T_6	FYM @ 10 t/ha + Poultry manure @ 2.5 t/ha
T_7	Vermicompost @ 2.5 t/ha + Neem cake @ 1 t/ha
T_8	Vermicompost @ 5 t/ha + VAM + Pseudomonas + Trichoderma + Azotobacter
T_9	Neem cake @ 2 t/ha + VAM + Pseudomonas + Trichoderma + Azotobacter
T_{10}	FYM @ 20 t/ha + VAM + Pseudomonas + Trichoderma + Azotobacter
T_{11}	Recommended NPK (50:50:50 kg NPK/ha)
T_{12}	Untreated control

1.	Center:	:		2.	Season	:	
3.	Design of experiment	:		4.	Replication	:	
5.	Gross plant size	:	m^2	6.	Net plat size	:	m^2
7.	Date of sowing/transplant	:		8.	Date of Harvesting	:	
9.	Variety	:		10.	Spacing	:	
11.	Fertilizer dose	:					

12. Initial soil fertility:

PH	OC (%)	Available N (kg/ha)	Available P_2O_5 (kg/ha)	Available K_2O (kg/ha)

Treatment	Plant stand/plant emergence (%)	Days to first fruit harvest	Number of fruits/Plant (Average of five plants/plot)	Average fruit weight (g) (2nd & 3rd Picked fruits and average of 10	Marketable Yield /plant (kg) (average of five plants / plot)	Total Marketable yield /plot (Kg)	Soil Fertility status at the end of experiment			Economics of production.							
										Cost of cultivation			Sale price coriander (Rs)	Sale price radish (Rs)	Gross return (Rs)	Net return (Rs)	B:C ratio
							N (kg/ha)	Phosphorous (kg /ha)	Potassium (kg/ha)	Fertilizer cost (Rs)	Other cost(Rs)	Total cost (Rs)					
	13	14	15	16	17	18	19	20	21	22	24	25	26	27	28	29	30
T_1																	
T_2																	

T_{14}																	
CD (P=0-05)																	
CV %																	

Veg. 5.26.2: Trial on organic production of spinach beet

Centre: Srinagar, Nagaland, Kalyanpur

Treatment	Entries
T_1	RDF (N 60 kg/ha)
T_2	VC(3t/ha)
T_3	FYM(12t/ha)
T_4	Mustardcake(1.15t/ha)
T_5	VC(3t/ha)+PSB+Azospirrilium(each5kg/ha)
T_6	FYM(12t/ha) +PSB+Azospirrilium(each5kg/ha)
T_7	Mustardcake(1.15t/ha) +PSB+Azospirrilium(each5kg/ha)

1.	Center:	:		2.	Season	:	
3.	Design of experiment	:		4.	Replication	:	
5.	Gross plant size	:	m^2	6.	Net plat size	:	m^2
7.	Date of sowing/transplant	:		8.	Date of Harvesting	:	
9.	Variety	:		10.	Spacing	:	
11.	Fertilizer dose	:					

12. Initial soil fertility:

PH	OC (%)	Available N (kg/ha)	Available P_2O_5 (kg/ha)	Available K_2O (kg/ha)

Treatment	**Spinach beet observations**				**Soil Fertility status at the end of experiment**			**Economics of production.**			
	Plant stand/plant emergence (%)	Plant height (cm) at harvest of coriander	Weight of 10 plant (g)	Plant stand/plant emergence (%)	N (kg/ha)	Phosphorous (kg /ha)	Potassium (kg/ha)	Cost of cultivation	Gross return	Net return	B:C ratio
	13	14	15	16	17	18	19	20	21	22	24
T_1											
T_2											

T_7											
CD (P=0-05)											
CV %											

Veg. 5.26.3 Organic farming in coriander-radish sequence

Centre – Bhubaneshwar, Dharwad, IIVR, Durgapura, Karaikal (05)

Treatments:
T_1- Conventional practices (Recommended FYM + fertilizer + pp chemicals)
T_2- Vermicompost @ X (pp with organic methods)
T_3- FYM @ (pp with organic methods)
T_4- Conventional practices (Recommended FYM + fertilizer + pp chemicals) + IIHR microbial consortium @ 12.5 kg/ha
T_5- Vermicompost @ X + IIHR microbial consortium @ 12.5 kg/ha (pp with organic methods)
T_6- FYM @ X + IIHR microbial consortium @ 12.5 kg/ha (pp with organic methods)
T_7- Safe production practices (Recommended FYM + fertilizer + pp chemicals) + IIHR microbial consortium @ 12.5 kg/ha

1.	Center:	:		2.	Season	:	
3.	Design of experiment	:		4.	Replication	:	
5.	Gross plant size	:	m^2	6.	Net plat size	:	m^2
7.	Date of sowing/transplant	:		8.	Date of Harvesting	:	
9.	Variety	:		10.	Spacing	:	
11.	Fertilizer dose	:					

12. Initial soil fertility:

PH	OC (%)	Available N (kg/ha)	Available P_2O_5 (kg/ha)	Available K_2O (kg/ha)

Treatment	**Coriender observations**				**Radish observations**						**Soil Fertility status at the end of experiment**			**Economics of production.**			
	Plant stand/plant emergence (%)	Plant height (cm) at harvest of coriander	Weight of 10 plant (g)	Plant stand/plant emergence (%)	Plant stand/plant emergence (%)	Root length of radish (cm) (Avg. of 10	Radish Root circumference (cm)	Radish average weight (g) (Avg. of	Root yield (kg/plot)	Shoot yield /plot (kg)	N (kg/ha)	Phosphorous (kg /ha)	Potassium (kg/ha)	Cost of cultivation	Gross return	Net return	B:C ratio
	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
T_1																	
T_2																	

T_7																	
CD (P=0-05)																	
CV %																	

Veg. 5.32 Enhancing water productivity by drip irrigation and mulching

Centre – Chitrakoot (2018-19) Ludhiana (02)

Treatment No.	**Treatment**
T_2	Irrigation 0.7 bar+blackpolythene mulch
T_3	Irrigation 0.9 bar+blackpolythene mulch
T_4	Irrigation 0.5bar

T_5	Irrigation 0.7 bar
T_6	Irrigation 0.9 bar
T_7	Flood Irrigation 0.9bar

1.	Center:	:		2.	Season	:	
3.	Design of experiment	:		4.	Replication	:	
5.	Gross plant size	:	m^2	6.	Net plat size	:	m^2
7.	Date of sowing/transplant	:		8.	Date of Harvesting	:	
9.	Variety	:		10.	Spacing	:	
11.	Fertilizer dose	:					

12. Initial soil fertility:

PH	OC (%)	Available N (kg/ha)	Available P_2O_5 (kg/ha)	Available K_2O (kg/ha)

Treatment	Plant stand (%)	Days to first fruit harvest	Number of fruits/Plant (Average of five plants / plot)	Average fruit weight (g) (2nd & 3rd Picked pods and average of 10 pods)	Marketable Yield /plant (kg) (average of five plants/plot)	Total Marketable yield /plot (Kg)	Soil Fertility status at the end of experiment			Economics of production.							
										Cost of cultivation			Sale price coriander (Rs)	Sale price radish (Rs)	Gross return (Rs)	Net return (Rs)	B:C ratio
							N (kg/ha)	Phosphorous (kg /ha)	Potassium (kg/ha)	Fertilizer cost (Rs)	Other cost(Rs)	Total cost (Rs)					
	13	14	15	16	17	18	19	20	21	22	24	25	26	27	28	29	30
T_1																	
T_2																	

T_{14}																	
CD (P=0-05)																	
CV %																	

Veg. 5.35 : Weed control in cowpea during kharif season

Centre – IIVR, Pasighat, (2018-19)-Hisar, Ludhiana, Kalyanpur, Raipur (6)

Treatment No.	Treatment
T_1	Weedy Check (control)
T_2	Weed free check (2-3 hand weeding) (first HW at 25 DAS)
T_3	Pre-emergence application of Pendimethalin @ 6 ml/L
T_4	Pre-application of Pendimethalin @ 6 ml/L + one HW
T_5	Pre-application of Pendimethalin @ 6 ml/L + Quizalofopehtyl 40-50 g/ha at 25 DAS
T_6	Pre-emergence application of Metribuzin @ 525 g/ha at 25 DAS
T_7	Post-emergence application of Metlachlor @ 1 kg/ha + 10 g urea/L as protected spray at 25 DAS

1.	Center:	:		2.	Season	:	
3.	Design of experiment	:		4.	Replication	:	
5.	Gross plant size	:	m^2	6.	Net plat size	:	m^2
7.	Date of sowing/transplant	:		8.	Date of Harvesting	:	
9.	Variety	:		10.	Spacing	:	
11.	Fertilizer dose	:					

12. Initial soil fertility:

PH	OC (%)	Available N (kg/ha)	Available P_2O_5 (kg/ha)	Available K_2O (kg/ha)

Treatment	Plant stand/plant emergence (%)	Weed Emergence (Population species wise) at 20 DAS and 60	Weed dry matter species wise at 20 DAS and 60 DAS	No of pod per plant	Average pod weight (g) (2nd & 3rd Picked fruits and average of 10	Total Marketable yield /plot (Kg)	Soil Fertility status at the end of experiment			Economics of production.							
										Cost of cultivation			Sale price coriander (Rs)	Sale price radish (Rs)	Gross return (Rs)	Net return (Rs)	B:C ratio
							N (kg/ha)	Phosphorous (kg /ha)	Potassium (kg/ha)	Fertilizer cost (Rs)	Other cost(Rs)	Total cost (Rs)					
	13	14	15	16	17	18	19	20	21	22	24	25	26	27	28	29	30
T_1																	
T_2																	

T_{14}																	
CD (P=0-05)																	
CV %																	

Veg. 5.40 : Weed management in okra

Centre – Vellanik Kara, IIVR, IIHR, Nagaland, Jorhat, Srinagar, Bhubaneshwar, (2018-19)- Hisar, Dharwad, Hyderabad (10)

Treatment No.	Treatment
T_1	Weedy Check (control)
T_2	Weed free check (2-3 hand weeding) (first HW at 25 DAS)
T_3	Pre-emergence application of Pendimethalin @ 6 ml/L
T_4	Pre-application of Pendimethalin @ 6 ml/L + one HW
T_5	Pre-application of Pendimethalin @ 6 ml/L + Quizalofopehtyl 40-50 g/ha at 25 DAS
T_6	Pre-emergence application of Metribuzin @ 525 g/ha at 25 DAS
T_7	Post-emergence application of Metlachlor @ 1 kg/ha + 10 g urea/L as protected spray at 25 DAS

1.	Center:	:		2.	Season	:	
3.	Design of experiment	:		4.	Replication	:	
5.	Gross plant size	:	m^2	6.	Net plot size	:	m^2

7.	Date of sowing/transplant	:		8.	Date of Harvesting	:	
9.	Variety	:		10.	Spacing	:	
11.	Fertilizer dose	:					

12. Initial soil fertility:

PH	OC (%)	Available N (kg/ha)	Available P_2O_5 (kg/ha)	Available K_2O (kg/ha)

Treatment	Plant stand/plant emergence (%)	Weed Emergence (Population species wise) at 20 DAS and 60	Weed dry matter species wise at 20 DAS and 60 DAS	No of Fruit per plant	Average fruit weight (g) (2nd & 3rd Picked fruits and average of 10	Total Marketable yield t/ha	Soil Fertility status at the end of experiment			Economics of production.							
							N (kg/ha)	Phosphorous (kg /ha)	Potassium (kg/ha)	Cost of cultivation			Sale price coriander (Rs)	Sale price radish (Rs)	Gross return (Rs)	Net return (Rs)	B:C ratio
										Fertilizer cost (Rs)	Other cost(Rs)	Total cost (Rs)					
	13	14	15	16	17	18	19	20	21	22	24	25	26	27	28	29	30
T_1																	
T_2																	

T_{14}																	
CD (P=0-05)																	
CV %																	

Session –VII

DISEASE MANAGEMENT

Chairperson	:	Dr. M.K. Reddy, Head, ICAR-IIHR, Bengaluru
Co-Chairperson	:	Dr. A.S. Mathur, RARI, Jaipur
Convener	:	Dr. K.K. Pandey, Principal Scientist, ICAR-IIVR, Varanasi
Rapporteurs	:	Dr. Abhishek Sharma, Professor, PAU, Ludhiana Dr. A.N. Tripathi, Scientist, ICAR-IIVR, Varanasi

Chairman formally welcomed the participants and briefed about the technical programme of the year 2017-18 on disease management. Total eight trials were allotted to 20 centers and all the centers submitted their results. During presentation of different trials following suggestions were emerged:

Suggestions:

1. The results should be in strict compliance of the technical programme.
2. The results of trail Veg 8.24 on monitoring of emerging diseases are still being reported in old format by few centers. Only new emerging problems and their pre-disposing factors should be reported.
3. Few problems like breaking of stems from collar region in chilli and tomato, stem splitting in cucurbits, phytoplasma diseases are emerging one and their management should be addressed.
4. The data of disease incidence should be transformed accordingly before statistical analysis.
5. Pesticide Residue analysis may be taken up only for recommended treatment.
6. Experiment on yield loss assessment should be carried as per the technical programme and one or two diseases to be taken up in a year.
7. To formulate new technical programme for the year 2018-19, a committee of following scientists was constituted Dr MK Reddy (Chairman), Dr KK Pandey, Dr S Kansal, Dr CP Khare and Dr Abhishek Sharma

Recommendations:

The following recommendations were made from the experimental results of the different AICRP centers:

Recommendations Disease Management AICRP (VC) 2017-18

Nursery disease management using bioagents and new fungicides (8.18) at Hyderabad: Three years dat have been concluded at Hyderabad centers and found that in Tomato among the different treatments tested for the nursery disease management *Trichoderma viridae* was found effective among the bio agents in management of damping off. In Brinjal among the different bio agent tested *Trichoderma viridae* was found effective in management of damping off. In Chilli among the tested bio agents minimum damping off was recorded in *Pseudomonas flourescence* treated plot.

Integrated management of vector borne virus diseases of chilli (Veg 8.19) at Kalyani, Sabour, Solan and Rahuri: Treatment **T5** involving application of neem cake @1.0kg/m^2in the seed bed, spraying of cyazpyr @1.8ml/liter 2-3 days before transplanting, seed treatment with imidacloprid @8g/kg, seedling dip of imidacloprid @0.5ml/L and growing of two rows of maize as border crop in the main

field along with sliver agrimulch sheet + rotational spraying of insecticides (acephate @1.5g/L+ neem oil @2.0ml/L) followed by (fipronil @1.0 ml/L+ neem oil @ 2.0ml/L), (imidacloprid @2 g/15L+neem oil @2.0ml/L) and (cyazypyr @1.8ml/L) at7 days interval till fruit formation was found very effective and significantly reduced chilli leaf curl disease, white fly and thrips populations, while increased the fruit yield**.** The ICBR was 3.46 at Kalyani on cultivar Sel-4, 3.42 in cultivar DKC-8 at Solan, whereas, C:B ratio 1:2.2 at Sabour, 1:1.76 on cultivar Phule Jyoti at Rahuri. However, the samples of marketable green chilli analyzed at Kalyani for pesticide residues and no pesticides have been detected and quantified.

IDM package for tomato diseases (Veg 8.20) at Bhubaneswar, Hyderabad, Junagadh, Solan and Kalyani: Treatment T5 integrated management practice involving seed priming with Seed Pro @4g/ kg of seed followed by soil application of Seed Pro @10g/kg of soil while filling of pro trays and soil drenching of Seed Pro @5% after seed germination followed by covering with 50- mesh nylon net of nursery bed supplemented with border row planting (2 rows) of maize at least 15 days before transplanting of seedlings in the main field followed by seedling dip with 0.1% (carbendazim 12%+mancozeb 63% WP) at the time of transplanting and sequential spraying with acephate 75% WP @1.5g/l on 10 DAT, fipronil 5% SC @1.5ml/l on 20 DAT, copper hydroxide 77% WP (2.0g/l) on 25 DAT, imidacloprid 70% WG @2g/15l on 40 DAT, fenamidone 10% + mancozeb 50% WDG (0.25%) two to three times from 45 DAT at 10 days intervals was highly effective in the management of tomato diseases and maximum fruit yield. The B:C ratio 4.0 on variety Utkal Kumari at Bhubaneshwar, 1.75 in variety Arka Vikas at Hyderabad, whereas, ICBR 5.2 on cultivar JT-3 at Junagarh, 6.16 on variety Naveen at Solan, 5.7 on hybrid L-37at Kalyani was recorded. Pesticide Residue Analysis at Kalyani for this treatment revealed that no pesticides have been detected.

However, at **Rahuri** chemical module T4 comprising of seed treatment with captan 50% WP (2g/kg) + drenching of nursery by fosetyl Al 80% WP @0.1% immediately after germination, foliar spray of nursery with copper hydroxide 77% WP (2.0g/l) at 3-5 leaf stage and in main field seedling dip with 0.1% (carbendazim 12% + mancozeb 63%WP), spray of acephate 75% WP @1.5 g/l on 10 days after transplanting, spray with fipronil 5% SC @1.5 ml/l on 20 DAT after transplanting, spray with copper hydroxide 77% WP (2.0g/l) on 25 DAT, spray with imidacloprid 70% WG @2g/l on 40 DAT and spray with fenamidone 10% + mancozeb 50% WDG (0.25%) two times was effective. The C: B ratio was 1:1.74 on cultivar Phule Raja which may be recommended.

IDM packages for cucurbit diseases (Veg 8.22) at **Kalyani and Rahuri:** Integrated IDM module T5 involving growing of two rows of maize as border crops and use of agri silver mulch sheet followed by seed treatment with carbendazim 12%+ mancozeb 63% @3 g/kg and drenching of captan 70% + hexaconazole 5%WP @ 0.1% 15 days after germination followed by spraying of tebuconazole 50% + trifloxystrobin 25% @1g/l + spray with (imidacloprid 17.8 SL @7.5 ml/ 15 l+ Neem oil 0.2%) followed by fosetyl-Al @0.1% followed by spraying of tebuconazole 50% + trifloxystrobin 25% @1g/l + spray with (imidacloprid 17.8 SL @ 7.5 ml/ 15 l + neem oil 0.2%) followed by fosetyl-Al @0.1% at 10 days interval was highly effective against gummy stem blight, powdery mildew and downy mildew with maximum fruit yield. The ICBR 8.9 in bottle gourd cv Jorabota (Local) was recorded at Kalyani, C:B ratio 1:3 in cucumber variety Himangi was recorded at Rahuri. The marketable bottle gourd fruits analyzed for pesticide residue at Kalyani and no pesticides have been detected.

Though some of the centers have compiled three years data of the trial Veg 8.19 and Veg 8.22 yet some technical information's are missing therefore, these centers may resubmit the data for incorporation of their recommendation in ensuing year.

TECHNICAL PROGRAMME FOR 2018-19

S. No.	Crop (s)	Experiment and year of start	No. of Centres	Location
Veg. 8.18	Tomato, Brinjal and chilli	Nursery disease management using bioagents and new fungicides (2012).	03	Hyderabad, Kalyanpur, Varanasi
Veg. 8.19	Chilli	Integrated management of vector borne virus diseases of Chilli (2014).	9	Bhubaneswar, Coimbatore, Hessaraghatta, Kalyanpur, Lam, Ludhiana, Parbhani, Raipur, Vellanikkara
Veg. 8.20	Tomato	IDM package for tomato diseases (2014).	8	Coimbatore, Hessaraghatta, Kalyanpur, Ludhiana, Parbhani, Sabour, Varanasi, Vellanikkara, Allahabad
Veg. 8.21	Tomato/brinjal/ chilli/cucurbits/ leguminous vegetables	Collection and diversity analysis of collar rot, *Sclerotium rolfsii* (2014).	06	Hyderabad, Junagadh, Kalyani, Raipur, Sabour, Varanasi
Veg. 8.22	Cucurbits: Bitter gourd, Bottle gourd, Ridge gourd, Pointed gourd and Cucumber	IDM package for cucurbit diseases (2015).	12	Bhubaneswar, Coimbatore, Durgapura, Junagadh, Kalyanpur, Lam, Parbhani, Raipur, Sabour, Varanasi, Vellanikkara, Srinagar, Allahabad
Veg. 8.23	Capsicum	Bio-intensive management of diseases of capsicum under poly house (2015).	05	Hessaraghatta, Hyderabad, Ludhiana, Solan, Vellanikkara
Veg. 8.24	Major crops grown in the locality	Monitoring emerging diseases of vegetable crops (2016).	19	Bhubaneswar, Coimbatore, Durgapura, Hessaraghatta, Hyderabad, Junagadh, Kalyanpur, Kalyani, Katrain, Lam, Ludhiana, Parbhani, Rahuri, Raipur, Sabour, Solan, Varanasi, Vellanikkara, Banda
Veg. 8.25	Tomato/Okra	Assessment in yield losses due to major diseases in vegetable crops (2016)	19	Bhubaneswar, Coimbatore, Durgapura, Hessaraghatta, Hyderabad, Junagadh, Kalyanpur, Kalyani, Katrain, Lam, Ludhiana, Parbhani, Rahuri, Raipur, Sabour, Solan, Varanasi, Vellanikkara, Banda
Veg.8.26	Tomato	IDM for bacterial wilt management of tomato (2018)	7	Kalyani, Vellanikarra, Bhubneswar, Coimbatore, Hessaraghtta, Rahuri, Solan

Veg.8.27	Cucurbits	Identification of causal agent involved in stem splitting and gummy stem blight in cucurbit crops (2018)	15	Coimbatore, Durgapura, Hessaraghatta, Hyderabad, Junagadh, Kalyanpur, Katrain, Lam, Ludhiana, Parbhani, Rahuri, Sabour, Varanasi, Vellanikkara, Banda
Veg.8.28	Bitter gourd	Integrated management of bitter gourd virus diseases (2018)	18	Bhubaneswar, Coimbatore, Durgapura, Hessaraghatta, Hyderabad, Junagadh, Kalyanpur, Kalyani, Katrain, Lam, Ludhiana, Parbhani, Rahuri, Raipur, Sabour, Varanasi, Vellanikkara, Banda

Veg. 8.18. Nursery disease management using bio-agents and new fungicides (2012).
Centers: Hyderabad, Kalyanpur, Varanasi
Design: RBD
Variety: popular local variety
Spacing: standard spacing used for specific local variety
Bioagent Treatment: Seed treatment @4g/kg, soil application@10g/m^2, soil drenching @5%

*** Parameters to be recorded**

1	2	3	4	5	6	7			
Treatments	Rep	% Germination*	Seedling height (cm)	Root length (cm)	Vigour index	Percent incidence of disease*			
						Damping off	Rot	wilt	….
T1	R1								
	R2								
	R3								
T2	R1								
	R2								
	R3								

***Data to be transformed into arcsine value before analysis**

Treatment no.		**Details**
T_1	:	*Bacillus subtilis*(IIVR)
T_2	:	*Trichoderma viride*- 1(IIVR)
T_3	:	*Trichoderma viride*-2(IIVR)
T_4	:	*Trichoderma harzianum*(Kalyanpur)
T_5	:	*Pseudomonas fluorescens*(Kalyanpur)
T_6	:	Seed Treatment with carbendazim + mancozeb @1.5g/kg+drenching @0.1% Under nursery conditions
T_7	:	Pencycuron @1ml/litre drenching
T_8	:	Fosetyl-Al@0.1%drenching
T_9	:	Fenamidone + mancozeb@0.25% drenching
T_{10}	:	Control

8.19. Integrated management of vector borne virus diseases of chilli (2014).

Centers: Bhubaneswar, Coimbatore, Hessaraghatta, Kalyanpur, Kalyani, Lam, Ludhiana, Parbhani, Rahuri, Raipur, Sabour, Solan, Vellanikkara

*** Parameters to be recorded**

1	2	3				4				5				6
Treatments	Rep	Disease incidence (%) (Leaf curl, mosaic, necrosis)				Vector population (whitefly, aphids, thrips)				Other biotic stress susceptibility				Remarks or any other important parameter
		7 DAT	14 DAT	21 DAT	…….	7DAT	14 DAT	21 DAT	….	Insect pest incidence	No. of Root-knot nematode galls	…	…	
T1	R1													
	R2													
	R3													
T2	R1													
	R2													
	R3													

***Data to be transformed into arcsine value before analysis**

7											8
Yield											C:B Ratio
Marketable Yield per plot (kg)					Unmarketable yield/ plot (Kg)					Total yield / q	
Ist picking	IInd picking	IIIrdpicking	……	Final	Ist picking	IInd picking	IIIrdpicking	……	Final		

T0: Application of neem cake @ 1.0kg/sq.mt in the seed bed, spraying of Cyazpyr @ 1.8ml/liter 2-3 three days before transplanting, seed treatment with imidacloprid @ 8gm/kg, seedling dip of imidacloprid @ 0.5ml/L and growing of two rows of maize/sorghum (jowar) as boarder crop in the main field along with sliver agrimulch sheet

T1: T0 + spray of acephate @ 1.5 g/L + Neem Oil @ 2.0ml/L at 7 days interval till fruit formation
T2: T0 + spray of fipronil @ 1.0 ml/L + Neem Oil @ 2.0ml/L at 7 days interval till fruit formation
T3: T0 + spray of imidacloprid @ 2 g/15L + Neem oil @ 2.0ml/L at 7 days interval till fruit formation
T4: T0 + spray of Cyzpyr @ 1.8ml/L at 7 days interval till fruit formation
T5: T0 + spray inrotation of T1 + T2 + T3 +T4 sequential application at 7 days interval till fruit formation
T6: Control
Replications: 4
Design: RBD
*Analysis to be performed on angular transformed values of data recorded
*Statistically analyzed data to be reported in tabular form with CD and CV.
*Experiment to be conducted in RBD design

*Virus incidence to be recorded based on symptom testing by ELISA or PCR and name of virus recorded to be mentioned. For exampleChilli leaf curl virus, Cucumber mosaic virus, Chilli veinal mottle virus, Groundnut bud necrosis virus etc.

8.20: IDM package for tomato diseases (2014).

Centres: Bhubaneswar, Coimbatore, Hessaraghatta, Hyderabad, Junagadh, Kalyanpur, Kalyani,Ludhiana, Parbhani, Rahuri, Sabour, Solan, Varanasi, Vellanikkara, Srinagar

* Parameters to be recorded

1	2	3										4
Treatments	Replication	Disease incidence (%)										Remarks, if any
		Damping off	Fusarium wilt	Collor rot	EB	LB	Bac leaf spot	Tospo virus	ToLCV	Mosaic	Root-knot nematode galls/plant	
T1	R1											
	R2											
	R3											
T2	R1											
	R2											
	R3											

***Data to be transformed into arcsine value before analysis**

5											6
Yield											C:B Ratio
Marketable Yield per plot (kg)					Unmarketable yield/ plot (Kg)					Total yield / q	
Ist picking	IInd picking	IIIrdpicking	……	Final	Ist picking	IInd picking	IIIrdpicking	……	Final		

Target diseases: Damping off (*Pythium aphanidermatum*), *Fusarium* wilt (*F. oxysporum*f.sp. *lycopersici*), Collar rot (*Sclerotium rolfsii*), early blight (*Alternaria solani*), late blight (*Phytophthora infestans*), bacterial leaf spot (*Xanthomonas campestris* pv. *vesicatoria*), GBNV (Tospo virus) and leaf curl disease (ToLCV), Root knot nematode (*Meloidogyne* spp).

Treatment details
Design: RBD
No of treatment: 6
Replication: 4
Variety: Local popular variety (Specify staking/Non staking)

T_0.Common to all treatments: Covering of nursery with 40-60 mesh white nylon net until transplanting+ Border crop with maize in main field.

T1. Treatment with biological control

i) Nursery treatment with Seed Pro: Seed priming @ 4g/kg, ii) soil application @10 g/Kg of soil while potting, and iii) soil drenching @ 5% after seed germination

Main field treatment with Seed Pro**:** Seedling dip (5%) and three sprays with Seed Pro (1.0%) at 10 days interval.

T2. Treatment with fungicides

Nursery treatment: Seed treatment with captan 50% WP (2g/kg) + drenching with fosetyl Al 80% WP @ 0.1% immediately after germination + spray with copper hydroxide 77% WP (2.0 g/l) at 3-5 leaf stage.

Main field treatment: Seedling Dip with 0.1 % (carbendazim12%+ mancozeb63%WP) + spray with copper hydroxide 77% WP (2.0 g/l) on 25 DAT + spray with fenamidone10%+ mancozeb50%WDG (0.25%) two to three times from 45 DAT at 10 days intervals.

T3. Treatment with Insecticides

Main field treatment: Spray with acephate 75% WP @1.5 g/l on 10 days after transplanting+ spray with fipronil 5% SC @ 1.5 ml/l on 20 DAT + spray with imidacloprid 70% WG @ 2g / 15 l on 40 DAT

T4. Treatment with fungicides and insecticides

Nursery treatment: Seed treatment with captan 50% WP (2g/kg) + drenching with fosetyl Al 80% WP @ 0.1% immediately after germination + spray with Copper hydroxide 77% WP (2.0 g/l) at 3-5 leaf stage.

Main field treatment**:** Seedling Dip with 0.1 % (carbendazim12%+ mancozeb63%WP) + spray with Acephate 75% WP @1.5 g/l on 10 days after transplanting+ spray with fipronil 5% SC @ 1.5 ml/l on 20 DAT+ spray with Copper hydroxide 77% WP (2.0 g/l) on 25 DAT + spray with imidacloprid 70% WG @ 2g / 15 l on 40 DAT + spray with fenamidone10%+ mancozeb50%WDG (0.25%) two to three times from 45 DAT at 10 days intervals.

T5. Integrated management

Nursery treatment with Seed Pro:Seed priming @ 4g/kg, ii) soil application @10 g/Kg of soil while potting, and iii) soil drenching @ 5% after seed germination.

Main field treatment: Seedling Dip with 0.1 % (Carbendazim12%+ Mancozeb63%WP) + spray with Acephate 75% WP @1.5 g/l on 10 days after transplanting+ spray with Fipronil 5% SC @ 1.5 ml/l on 20 DAT+ spray with Copper hydroxide 77% WP (2.0 g/l) on 25 DAT + spray with imidacloprid 70% WG @ 2g / 15 l on 40 DAT + spray with Fenamidone10%+ Mancozeb50%WDG (0.25%) two to three times from 45 DAT at 10 days intervals.

T6. Control

8.21: Collection and diversity analysis of collar rot, *Sclerotium rolfsii* (2014)

Centres: Hyderabad, Junagadh, Kalyani, Raipur, Sabour, Varanasi

Crop: Tomato/brinjal/chilli/cucurbits/leguminous vegetables

Data to be recorded

1. Percentage incidences in different vegetable crops
2. Collection, isolation of the pathogen (on PDA) and proving pathogenicity
3. Host range studies: Multiply the pure culture of the pathogen in sand maize (19:1) and after 10 days, inoculate the sand maize culture into pot soil (@10% v/v). Sow the seeds/transplant the seedlings and observe for infection. Maintain two controls *viz.*, inoculated control (ie the crop in which the pathogen was isolated should be included) and un-inoculated control (without pathogen inoculation).
4. Morphological characterization mainly to observe for formation of sclerotia after 5-7 days of culturing.

5. Next year, based on the available collection the selected centres will do cross infectivity and molecular diversity analysis.

Veg 8.22: IDM package for cucurbit diseases (2015).

Crops: Bitter gourd, Bottle gourd, Ridge gourd, Pointed gourd and Cucumber
Centres: Bhubaneswar, Coimbatore, Durgapura, Junagadh, Kalyanpur, Kalyani, Lam, Parbhani, Rahuri, Raipur, Sabour, Varanasi, Vellanikkara, Srinagar
Treatment details:
T0: Growing of two rows of maize as border crops and use of agri silver mulch sheet.
T1: T0 + Seed treatment with Seed Pro @ 25 g/kg and soil drenching of Seed Pro @ 5% at 1st true leaf stage after germination followed by 5-6 spray of Seed Pro (1%) at 10 day interval in rotation with Neem oil (0.2%) alternatively after 15 days after drenching
T2: T0 + Seed treatment with carbendazim 12% + mancozeb 63% @3 g/kg and drenching of captan 70% + hexaconazole 5% WP @0.1% at 1st true leaf stage after germination followed by 5-6 spraying of Seed Pro (1%) at 10 day interval in rotation with Neem oil (0.2%) alternatively after 15 days after drenching
T3: T0 + Seed treatment with Seed Pro @25 g/kg and soil drenching of Seed Pro @ 5% 1st true leaf stage after germination followed by spraying of captan 70% + hexaconazole 5% WP @ 0.1% followed by spraying of (imidacloprid 17.8 SL @ 7.5 ml/ 15 l + Neem oil 0.2%) followed by fosetyl-Al @ 0.1% followed by captan 70 % + hexaconazole 5% WP @ 0.1% followed by spraying of (imidacloprid 17.8 SL @ 7.5 ml/ 15 l + Neem oil 0.2%) followed by fosetyl-Al @ 0.1% at 10 days interval.
T4: T0 + Seed treatment with Seed Pro @ 25 g/kg and soil drenching of Seed Pro @ 5% at1st true leaf stage after germination followed by spray of (imidacloprid 17.8 SL @ 7.5 ml/ 15 l + Neem oil 0.2%) followed by spray of tebuconazole 50%+trifloxystrobin 25% @1g/l followed by Fosetyl-Al @ 0.1%, followed by spray of tebuconazole 50%+trifloxystrobin 25% @1g/l followed by spray of (imidacloprid 17.8 SL @7.5 ml/ 15 l + Neem oil 0.2%) followed by Fosetyl-Al @0.1% at 10 days interval
T5: T0 + Seed treatment with carbendazim 12%+ mancozeb 63% @ 3 g/kg and drenching of captan 70 % + hexaconazole 5% WP @ 0.1% 15 days after germination followed by spraying of tebuconazole 50% + trifloxystrobin 25% @1g/l + spray with (imidacloprid 17.8 SL @ 7.5 ml/ 15 l + Neem oil 0.2%) followed by Fosetyl-Al @ 0.1% followed by spraying of tebuconazole 50% + trifloxystrobin 25% @1g/l + spray with (imidacloprid 17.8 SL @ 7.5 ml/ 15 l + Neem oil 0.2%) followed by fFosetyl-Al @ 0.1% at 10 days interval
T6: T0 + Seed treatment with carbendazim 12%+ mancozeb 63% @ 3 g/kg and drenching of captan 70 % +hexaconazole 5% WP @ 0.1% 15 days after germination followed by spray with (imidacloprid 17.8 SL @ 7.5 ml/ 15 l + Neem oil 0.2%) %) followed by spraying of captan 70 % +hexaconazole 5% WP @ 0.1% followed by fosetyl-Al @ 0.1% followed by spraying of captan 70 % +hexaconazole 5% WP @ 0.1% + spray with (imidacloprid 17.8 SL @ 7.5 ml/ 15 l + Neem oil 0.2%) %) followed by fosetyl-Al @ 0.1% at 30 days after drenching
T7: Control

Treat-ment	T0: Growing of Maize as border crop 15 days before sowing+ Silver mulching							
	Seed Treatment	**Drenching at 1st true leaf stage**	**Spray Schedule**					
			1st	**2nd**	**3rd**	**4th**	**5th**	**6th**
T1: T0 +	Seed Pro @ 25 g/kg	Seed Pro @ 5%	Seed Pro (1%)	Neem oil (0.2%)	Seed Pro (1%)	Neem oil (0.2%)	Seed Pro (1%)	Neem oil (0.2%)
T2 : T0+	carbendazim 12%+ mancozeb 63% @ 3 g/kg	Captan 70 % +Hexaconazole 5% WP @ 0.1%	Seed Pro (1%)	Neem oil (0.2%)	Seed Pro (1%)	Neem oil (0.2%)	Seed Pro (1%)	Neem oil (0.2%)
T3: T0 +	Seed Pro @ 25 g/kg	Seed Pro @ 5%	Captan 70 % + Hexaconazole 5% WP @ 0.1%	(Imidacloprid 17.8 SL @ 7.5 ml/ 15 l + Neem oil 0.2%)	Fosetyl-Al @ 0.1%	Captan 70 % + Hexaconazole 5% WP @ 0.1%	(Imidacloprid 17.8 SL @ 7.5 ml/ 15 l + Neem oil 0.2%)	Fosetyl-Al @ 0.1%
T4: T0 +	Seed Pro @ 25 g/kg	Seed Pro @ 5%	(Imidacloprid 17.8 SL @ 7.5 ml/ 15 l + Neem oil 0.2%)	Tebuconazole 50%+Trifloxystrobin 25% WG @1g/l	Fosetyl-Al @ 0.1%	Tebuconazole 50%+Trifloxystrobin 25% WG @1g/l	(Imidacloprid 17.8 SL @ 7.5 ml/ 15 l + Neem oil 0.2%)	Fosetyl-Al @ 0.1%
T5: T0 +	carbendazim 12%+ mancozeb 63% @ 3 g/kg	Captan 70 % +Hexaconazole 5% WP @ 0.1%	Tebuconazole 50%+Trifloxystrobin 25% WG @1g/l	(Imidacloprid 17.8 SL @ 7.5 ml/ 15 l + Neem oil 0.2%)	Fosetyl-Al @ 0.1%	Tebuconazole 50%+Trifloxystrobin 25% WG @1g/l	(Imidacloprid 17.8 SL @ 7.5 ml/ 15 l + Neem oil 0.2%)	Fosetyl-Al @ 0.1%
T6: T0 +	carbendazim 12%+ mancozeb 63% @ 3 g/kg	Captan 70% + Hexaconazole 5% WP @ 0.1%	(Imidacloprid 17.8 SL @ 7.5 ml/ 15 l +Neem oil 0.2%)	Captan 70 % + Hexaconazole 5% WP @ 0.1%	Fosetyl-Al @ 0.1%	Captan 70 % + Hexaconazole 5% WP @ 0.1%	(Imidacloprid 17.8 SL @ 7.5 ml/ 15 l + Neem oil 0.2%)	Fosetyl-Al @ 0.1%
T7	Control							

Veg 8.23: Bio-intensive management of diseases of capsicum under protected cultivation

Centers: Hessaraghatta, Hyderabad, Ludhiana, Solan, Vellanikkara

T_0 – * Soil Solarization after flooding the structure and covering it by 200 gauge transparent polysheetfor three weeks. Seed treatment with seed pro@10g/kg seeds + Soil drenching with seed pro(@ 5%)+ Application of 5kg FYM fortified with 500g neem cake and 50 g *Trichoderma* sp + 50 g *Paecilomyceslilacinus* at the time of bed preparation.

T1- T_0+ Foliar spray with *Trichoderma* sp. (2%) 6-7 times at 15 days interval beginning from 30 days after transplanting

T2- T_0+Foliar spray with *Pseudomonas fluorescens* (2%) 6-7 times at 15 days interval beginning from 30 days after transplanting.

T3- T_0+ Foliar spray with neem oil (0.2%) / NSKE(2%) 6-7 times at 15 days interval beginning from 30 days after transplanting.

T4- T_0+ Foliar sprays with Phyton T @4ml/l 6-7 times at 15 days interval beginning from 30 days after transplanting.

T5-Soil drenching with Phyton T @5ml/l + Foliar spray with Phyton T @4ml/l three times at 15 days interval beginning from 30 days after transplanting.

T6- T_0+ Foliar sprays with Bordeaux mixture 0.8% 6-7 times at 15 days interval beginning from 30 days after transplanting.

T7- T_0+ Control

*Yellow and blue sticky traps are to be kept in all treatment except control

** Spray Micronutrient (Vegetable Special–IIHR/ Commercial formulation) once a month

Veg. 8.24: Monitoring emerging diseases of vegetable crops (2016).

Centers: Bhubaneswar, Coimbatore, Durgapura, Hessaraghatta, Hyderabad, Junagadh, Kalyanpur, Kalyani, Katrain, Lam, Ludhiana, Parbhani, Rahuri, Raipur, Sabour, Solan, Varanasi, Vellanikkara, Banda.

Methodology & Observations

- Recording new diseases in vegetable crops appeared in the region with good quality photograph.
- Recording of predisposing factors for emergence of disease.
- Disease scoring based on 0-5 rating scale where, 0 = no infection, 1 = 1-19% infection, 2 = 20-39% infection, 3 = 40-59% infection, 4 = 60-79% infection and 5 = 80-100% infection. The disease should be expressed in the form of percent disease index (PDI).

Veg. 8.25: Assessment of yield losses due to major diseases in vegetable crops(2016).

Centers: Bhubaneswar, Coimbatore, Durgapura, Hessaraghatta, Hyderabad, Junagadh, Kalyanpur, Kalyani, Katrain, Lam, Ludhiana, Parbhani, Rahuri, Raipur, Sabour, Solan, Varanasi, Vellanikkara, Banda.

Methodology & Observations

Diseases: Late blight and leaf curl complex in tomato; YVMV and OELCV in okra.

- Select commercial cultivar of the region.
- Adopt all standard agronomical practice to raise the crop.
- Sow/transplant minimum of 100 plants, tag all plants at once
- Observation may be recorded at 15 days interval
- Mark the infected plant as 1,2,3 …so on at every visit you see infected ones.
- Record the yield of individual plant.
- Record disease severity/PDI at last tagging
- Calculate average yield on per plant basis on diseased plant having same tag no.

Table of observation for Okra (YVMV/ELCV)

S. No.	**Visit No. (DAS)**	**Tag No.**	**P_1… P_n for 1** (15 DAP)	**P_1… P_n for 1** (30 DAP)	**P_1… P_n for 1** (45 DAP)	**P_1… P_n for 1** (60 DAP)	**P_1… P_n for 1** (75 DAP)	**P_1… P_n for 1** (90 DAP)	**Cumulative yield for P_1… P_n for 1**	**Ave. Yield P_1… P_n for 1**	**Yield (q/ha)**
1.	15 days	Tag No. 1			G & Y	G & Y	G & Y	G & Y	G & Y	G & Y	G & Y
2.	30 days	Tag No. 2		P_1… P_n for 2 (30 DAP)	P_1… P_n for 2 (45 DAP)	P_1… P_n for 2 (60 DAP)	P_1… P_n for 2 (75 DAP)	P_1… P_n for 2 (90 DAP)	Cumulative yield for P_1… P_n for 2	Ave. Yield P_1… P_n for 2	Yield (q/ha)
3.	45 days	Tag No. 3			P_1… P_n for 3 (45 DAP)	P_1… P_n for 3 (60 DAP)	P_1… P_n for 3 (75 DAP)	P_1… P_n for 3 (90 DAP)	Cumulative yield for P_1… P_n for 3	Ave. Yield P_1… P_n for 3	Yield (q/ha)
4.	60 days	Tag No. 4				P_1… P_n for 3 (60 DAP)	P_1… P_n for 3 (75 DAP)	P_1… P_n for 3 (90 DAP)	Cumulative yield for P_1… P_n for 3	Ave. Yield P_1… P_n for 3	Yield (q/ha)
5. . . . 10	5 10										

New Experiment

Veg-8.26: IDM for bacterial wilt management of Solanaceous vegetable crops (2018)

Allotted centers: Kalyani, Vellanikarra, Bhubaneswar, Coimbatore, Hessaraghtta, Rahuri, Solan

Treatment details:

Treatment	Details
T1	Soil application of bleaching powder @15kg/ha before transplanting
T2	Soil amendment with lime depending upon pH of the soil to make soil neutral.
T3	Seedling root dipping by Streptocycline @ 200ppm
T4	Drenching of copper oxychloride @0.3% thrice at 10 days interval started 20 days after transplanting.
T5	Seed treatment (10g/kg seed) and seedling dip @1% with *Pseudomonas fluorescence*
T6	Drenching of *Pseudomonas fluorescence* @1% thrice at 10 days interval started 20 days after transplanting.
T7	Integration of T1,T2,T3 and T4
T8	Integration of T2, T5 and T6
T9	Control

Veg-8.27: Identification of causal agent involved in stem splitting and gummy stem blight in cucurbit crops (2018)

Allotted Centers: All centers except Raipur, Bhubaneshwar, Kalyani and Solan

Veg-8.28: Integrated management of bitter gourd virus diseases (2018)

Allotted Centers: All centers except Solan

Treatment details:

Treatment	Details
T0	Barrier crop with two rows of maize, mulching with silver plastic mulch, Sticky yellow traps in each plot
T1	T0 + spray of AMC @ 5 ml/l at 10 days interval
T2	Spray of kaolin @ 2% at 10 days interval
T3	Spray of sea weed extract @ 0.2% at 10 days interval
T4	Spray of butter milk @ 20% at 10 days interval
T5	Rotational spray of T1, T3 and pyriproxifen @ 0.1% at 10 days interval
T6	Spray of acephate @ 0.15% + neem oil @ 0.2% followed by pyriproxifen @ 0.1% at 10 days interval
T7	Control

Note: AMC will be supplied by ICAR-IIHR Bangalore within one month of requisition. First spray of the pesticides will be applied after 15 days of plant emergence

Session-VIII

Physiology, Biochemistry and Processing

Chairman	:	Dr. D. P Ray, Ex. Vice Chancellor, OUAT
Co-chairman	:	Dr. Jagdish Singh, I/c Head, Div. of Crop Production, IIVR
Convener	:	Dr. Sudhir Singh, Principal Scientist, ICAR-IIVR
Rapporteur	:	Dr. Neena Chawla, Sr. Biochemist, PAU

At the outset, the chairman in his introductory remarks, emphasized the importance of vegetables for food and nutritional security as the vegetables are rich source of vitamins especially folic acid, minerals, fibres and phyto-chemicals. Thereafter, the Chairman requested for the presentation of results of various trials conducted during 2017-18.

Under Biochemistry trials during 2017-18, PAU, Ludhiana, carried out biochemical estimation of antioxidant components in tomato, pumpkin, bitter gourd and muskmelon genotypes. Various quality parameters such as vitamin C, TSS, carotenoids, phenols and total sugar content were reported in different genotypes of vegetable crops. Tomato determinant variety -3 exhibited highest vitamin C (40.62 mg/100g) and lycopene (2.28 mg/100g) content.

In another trial, oxalate content in tomato varieties was reported at PAU, Ludhiana and IIVR, Varanasi. Both centres estimated oxalate content and citric acid in different AVT-I and AVT-II varieties of AICRP trials during breaker, turning, ripe and fully ripe stage of harvest. Maximum oxalate content and acidity in tomato varieties were recorded at breaker stage and minimum at fully ripe stage.

Under processing trials during 2017-18, assessment of tomato varieties under AVT-I and AVT-II for processing quality traits were carried out at IIVR, Varanasi, PAU Ludhiana and IIHR Bangalore. Tomato determinant-7 (AVT-I) had maximum ascorbic acid, TSS and lycopene content whereas tomato determinant-5 (AVT-I) had minimum lycopene content in all stages of harvest of breaker, turning, ripe and fully ripe stages of harvest.

The following suggestions/recommendations emerged from the discussion

Suggestions:

1. Appropriate statistical analysis should always be reported.
2. The concerned PI's of all the centres should present the results for better clarification and discussion.
3. All experiments should be strictly carried out as per the approved technical programme.
4. Dr Kirti Singh has suggested that one more vegetable crop variety should be evaluated for processing.
5. Some more staff in post-harvest technology may be deputed at IIVR,Varanasi.

Recommendations:

6. To minimize the variability in biochemical investigations, standard protocols should be followed at all the centres as per AOAC guidelines.
7. All entries of AVT-II trials should be included for biochemical estimations.

TECHNICAL PROGRAMME 2018-19

Biochemistry Trials

i) Biochemical estimation of antioxidant components in tomato, pumpkin, bitter gourd and muskmelon

Centres allotted	PAU, Ludhiana, IIHR, Bangalore and SKUAST, Kashmir
Varieties	Tomato, Pumpkin, Bitter gourd and Muskmelon
Design	RBD with three replications
Stage of harvest	Maturity
Observations to be recorded	Ascorbic acid, carotenoids, phenols and antioxidant activity

ii) Estimation of oxalate content in tomato AVT-II varieties under AICRP (VC) trials and correlation with acidity

Centres allotted	PAU, Ludhiana, IIHR, Bangalore, IIVR, Varanasi
Varieties	AVT-II varieties/genotypes under AICRP trials
Design	RBD with three replications
Stage of harvest	Ripe
Observations to be recorded	Acidity (% citric acid), oxalate

Processing trials

i) Tomato varieties/genotypes under AVT-II AICRP trials for processing

Centres allotted	PAU, Ludhiana, IIHR, Bangalore, IIVR, Varanasi
Varieties	AVT-II varieties/genotypes under AICRP trials
Design	RBD with three replications
Stage of harvest	Ripe
Observations to be recorded	Texture profile analysis, lycopene, ascorbic acid, total soluble solids and acidity

New trials

Processing trials

i) Quality assessment of tomato varieties/genotypes under AVT-II AICRP trials after processing to tomato pulp

Centres allotted	IIHR, Bangalore and IIVR, Varanasi
Design	RBD with three replications
Varieties	Promising AVT-II varieties/genotypes of AICRP trials
Stage of harvest	Ripe
Observations to be recorded	Lycopene, ascorbic acid, total soluble solids and acidity

Session IX

Insect Pest Management

Chairperson	:	Dr. D.B. Ahuja, Ex Director, NCIPM, New Delhi
Co-Chairperson	:	Dr. A.S. Baloda, Prof. Entomology, RARI, Durgapura Dr. A B Rai, AICRP-VC (i/c) & Head, ICAR-IIVR, Varanasi
Convener	:	Mr. Manjunatha Gowda T, Scientist, ICAR-IIVR, Varanasi Dr. Jaydeep Halder, Scientist, ICAR-IIVR, Varanasi
Rapporteurs	:	Mr. Manjunatha Gowda, Scientist, ICAR-IIVR, Varanasi Dr. S.A. Pawar, Junior Entomologist, MPKV, Rahuri

Insect Pest Management session was held on 19.05.2018 at 2.00 PM at the Chickpea committee hall, RARI, Durgapura. At the outset the convener welcomed the Chairman, Co-Chairman, other dignitaries and all the delegates present in the session. During the year 2017-18, a total of 81 trials were allotted to 11 coordinating centers. Out of 81trials, all were conducted and 25 trials are in-progress. At the outset Chairman and Co-chairman expressed their views on the problems of insect and nematode pests as major biotic constraints in the vegetable crops and concern over the pesticide residues levels in vegetable crops. Chairman stressed upon to develop integrated management strategies which are sustainable and ecofriendly, by involving, integrated module, bio-intensive modules as alternatives to chemical insecticides to reduce pesticide load in vegetable ecosystem. During the session the following Scientists presented the insect and nematode pest management trials for the year 2016-17 (for in progress trials) and 2017-18.

Sl. No.	Name of the Presenter	Crop/Trials
1.	Dr. Anitha D, VRS, SKLTSHU, Hyderabad	Brinjal, Okra, Chilli/Capsicum trials
2.	Dr. Shivaram Bhat P, ICAR-IIHR, Bengaluru	Tomato and Cabbage trials
3.	Dr. Waluniba, SASRD, Nagaland University, Nagaland	Cucurbits and others
4.	Dr. Sukhjeet Kaur, PAU, Ludhiana	Nematology trials

During the presentation, following suggestions were made

- Distribution and abundance of pests across the ecological regions should be considered while developing insect pest management modules
- Economic threshold level of a particular pest should be reflected in technical programme and accordingly treatment should be formulated.
- Registered molecule with green chemistries can be considered for testing on target pest.
- Active ingredient of Azadirachtin should be mentioned in concerned trial.
- Trials which are going to be completed, the most effective treatment can be analyzed for residue level with the assistance from NHRDF, Nasik.
- At final recommendation, name of the variety, time of application, percent increase yield over control and B: C ratio should be included.

- Evaluation of cassava based bio-pesticide (Nanma) for the management of pests of brinjal cv. Gulabi indicated that Nanma @ 10 ml/litre water was effective in the management of whitefly population with the fruit yield of 208.6 q/ha at Hyderabad. As soon as this botanical gets registered by CIBRC, it may be recommended for the benefit of farming community.
- In Punjab, chilli cv. Punjab Sandhuri indicated spray of Thiacloprid 21.7 SC@ 0.6 ml/l reduced thrips population up to 46.36% and mite population was upto 30.76% with fruit yield of 172.51 q/ha at Punjab. However, this centre is advised to provide B:C ratio for inclusion of final recommendation.
- Effect of different insecticides/strategies on shoot and fruit borer infestation in brinjal cv. Punjab Nagina indicated sequential spray of Spinosad 45 SC @ 0.5 ml/litre reported 21.25 per cent pest reduction with highest fruit yield of 281.33 q/ha in Punjab. Centre to advise to provide B: C ratio for inclusion of final recommendation.
- Evaluation of pest management modules for thrips and mites in chilli var. Punjab Sandhuri, indicated that integrated module (seedling root dip of Imidacloprid17.8 SL @ 0.5 ml/litre followed by spraying of Buprofezin 25 SC @ 1 ml/litre at 25 DAT , Fipronil5 SC @ 1.5 ml/litre at 35 DAT, spraying of *Lecanicillium lecanii* @ 5 g/ litre at 45 DAT, spraying of Chlorfenpyr 10 SC @ 1ml/litre at 55 DAT and spraying of neem oil 1% at 65 DAT was effective with yield of 63.72 q/ha with B:C ratio of 4.50 at Hyderabad and it was residue free and also in Punjab with 47.76 per cent reduction in chilli thrips population with fruit yield of 191.10 q/ha. Centre to advise to provide B: C ratio for inclusion of final recommendation.

The following scientists is nominated to compile and document pest diversity and mapping of solanaceous crops, cucurbitaceous crops, cole crops and economic important plant parasitic nematodes in vegetable crops across India in consultation with Division of Crop Protection, IIVR Varanasi. All the centers are advised to provide the information to nominated scientist related to respective crops with good photographs (including pests) for compilation.

Sl. No	Concerned scientists	Crops
1.	Dr. Anitha D, VRS, SKLTSHU, Hyderabad	Solanaceous crops
2.	Dr. Shivaram Bhat P, ICAR-IIHR, Bengaluru	Cucurbits crops
3.	Dr. R. S. Rana, YSPUHF, Solan	Cole crops
4.	Dr. Sukhjeet Kaur, PAU, Ludhiana	Plant parasitic nematodes

After the presentations the following recommendations/conclusions were drawn under IPM session.

- Spraying Neem Seed Powder Extract (40 g/litre) at an interval of 10 days starting from 25 DAT in cabbage (cv. Unnati) was found most effective for the management of diamond back moth (DBM) with lowest cumulative DBM count of 0.95/plant compared to 6.15 in untreated control. The increase in marketable yield was 89.3% over untreated control with benefit cost ratio of 5.53 at Bangalore.
- Cyantraniliprole 10.26% OD @ 1.8 ml/litre at 10 days intervals starting from appearance of *Tuta absoluta* in tomato (cv. Arka Rakshak) was found most effective for the management of the pest with fruit damage of 2.9% compared to 35.8% in untreated control. The marketable yield was 88.5 t/ha in this treatment compared to 43.3 t/ha in control with benefit cost ratio of 5.71 at Bangalore.

- For the management of leaf hoppers and whiteflies on okra (cv. Phule Utkarsha) two sprays of Flupyradifurone 200 SL @ 200 g a.i. /ha (2ml/litre) at an interval of 10 days starting from the pest infestation of leaf hoppers and whiteflies, with highest yield of 197.85 q/ha and B: C ratio of 2.75 at Rahuri.
- For the management of thrips and mites in chilli, Spiromesifen@ 0.6 ml/litre was effective against mites followed by Emamectin benzoate @ 0.5 g/litre and for the management of thrips, Fipronil@ 0.35 g/litre was effective followed by emamectin benzoate @ 0.5 g/litre. Highest yield (64.4 q/ha) was obtained in Emamectin benzoate treatment with B:C ratio of 1.65 at Hyderabad.
- Studies on the management of brinjal shoot and fruit borer under protected and open conditions indicated that the pest infestation under net house conditions reduced significantly and yield increased about 2.36 times *i.e.*, 136% in comparison with open conditions in Punjab.
- IPM module in cucurbits cv. MH 27 indicated Module 4 (seed treatment with Imidacloprid 48 FS @ 5-10g/kg seed, removal of cotyledon leaves 7 days after germination, spraying Emamectin benzoate 25 WG @ 0.04 g/litre, spraying neem oil 3000 ppm@ 5ml/litre and installation of cue lure traps 15 /acre and spraying Spinosad 45 SC 0.3 ml/ha) indicated 56.64 per cent reduction in fruit fly population with fruit yield of 155.82 q/ha at Punjab.
- In okra cv. Kashi Pragati seed treatment with *Pseudomonas putida* 1% A.S. @ 10 ml/ kg seed + application of 20 tons of FYM enriched with 5 lit of *Pseudomonas putida*/ ha was found effective with reduction in 68.5% root knot nematode, *Meloidogyne incognita* final population, root knot index 1.3 and 42% increase in marketable yield with B: C ratio of 1.25 under open field condition at Varanasi.
- In tomato cv. Kashi Aman, nursery drenching (substrate treatment with 5 ml of *Bacillus amyloliquefaciens* 1% A.S. / kg of coco peat for producing seedlings of tomato in portrays) + application of 20 tons of FYM enriched with 5 lit of *B. amyloliquefaciens* 1% A.S /ha was found effective with 70% reduction in final population of root knot nematode, *Meloidogyne incognita*, root knot index 1.8 and 24.7% increase in marketable yield with B: C ratio of 1.18 under open field condition at Varanasi.

The session was ended with thanks to chair.

TECHNICAL PROGRAMME (2018-19)

Trials in Entomology

Crops	Code	Name of Experiment (Year of start)	Centres allotted	No. of centres
Brinjal	9.1.1	Bio efficacy of cassava based bio pesticides on insect pest complex of brinjal (2012-13).	Ludhiana, Katrain	2
	9.1.2	Evaluation of different insecticide use strategies as resistance management and control tactics for shoot and fruit borer *Leucinodes orbonalis* in brinjal (2014-15).	Banda, Hyderabad, Nagaland	3
	9.1.3	Evaluation of biopesticides and insecticides for management of sucking pests complex in brinjal (2017-18)	Ludhiana, Sabour, Rahuri, Raipur, IIVR	5
Okra	9.2.1	Evaluation of new alternatives to neonicotinoid insecticides against sucking insect pests of okra (2015-16).	Sabour, Hyderabad, Ludhiana, Banda, Raipur,	5
	9.2.2	Development and evaluation of IPM modules for insect pest complex in okra (2017-18)	Sabour, IIHR, Rahuri, Raipur, Solan, Nagaland	6
Chilli/ Capsicum	9.3.1	Evaluation of pest management module for sucking pests complex in chilli (2014-15)	Sabour, Nagaland	2
Cabbage	9.4.1	Eco friendly management of insect pest of cabbage (2014-15)	Katrain, Nagaland	2
Tomato	9.5.1	Management of insect-pests of tomato (2014-15)	Sabour	1
	9.5.2	Survey and surveillance for new invasive insect pest *Tuta absoluta* in tomato (2015-16)	IIVR, IIHR, Sabour, Ludhiana, Rahuri, Hyderabad, Solan, Raipur, Nagaland	9
	9.5.3	Evaluation for identification of effective insecticides against *Tuta absoluta* in tomato (2015-16)	Rahuri, Hyderabad	2
	9.5.4	Development and evaluation of IPM modules for tomato pin worm *Tuta obsoluta* (2017-18)	Hyderabad, Rahuri, IIHR, IIVR, Raipur, Solan	6
Cucurbits	9.6.1	Evaluation of different pest management modules in cucurbits (2014-15).	Hyderabad, Solan, Katrain	3
	9.6.2	Evaluation of different pest management modules against vector and sucking pests management of Bitter gourd (2018-19)	IIHR, IIVR, Hyderabad, Nagaland, Rahuri, Ludhiana	6

	9.6.3	Evaluation of some novel insecticide molecule against whitefly of cucumber (2018-19)	Nagaland, Sabour, Solan, Ludhiana	4
	9.6.4	Evaluation of some entomopathogenic fungi and their compatibility with neem oil against whitefly of cucumber (2018-19)	IIHR, Hyderabad, Rahuri, Solan	4
Others	9.7.1	Seasonal incidence of major and emerging insect pests of vegetable crops	All centers	11
		Total		**71**

Trials in Nematology

Crop	Code	Name of Experiment	Centers allotted	No. of centers
Okra	9.8.1	Bio-efficacy of liquid formulation of bio-pesticide in the management of *Meloidogyne incognita* infecting okra (2015-16)	Ludhiana, IIHR	2
Tomato	9.9.1	Bio-efficacy of liquid formulation of biopesticide in the management of *Meloidogyne incognita* infecting tomato (2015-16)	Ludhiana, IIHR	2
	9.9.2.	Management of Root-knot nematodes (*M. incognita*) on tomato under open field conditions	Ludhiana, IIHR, IIVR	3
Cucumber	9.10.1	Management of Root-knot nematodes (*M. incognita*) in cucumber under protected conditions (2017-18)	Ludhiana, IIHR, IIVR	3
	9.10.2	Evaluation of talc based formulation of *Bacillus subtilis* (CRB7) in the management of *Meloidogyne incognita* infecting Cucumber (2018-19)	Ludhiana, IIHR, IIVR	3
Others	9.11.1	Screening of tomato and brinjal germplasm resistant/tolerant to soil-borne pathogens for resistance to root knot nematode *M. incognita* race 1. (2015-16)	Ludhiana, IIHR, IIVR	3
Brinjal	9.12.1	Bio-efficacy of liquid formulation of bio-pesticide *Bacillus megateruim* in the management of *Meloidogyne incognita* infecting Brinjal (2018-19)	Ludhiana, IIHR, IIVR	3
		Total		**19**

Entomology

Sr.No	Centres	Trials Allotted	No. of trials
1	IIVR	9.1.3, 9.5.2, 9.5.4, 9.6.2, 9.7.1	5
2	IIHR	9.2.2, 9.5.2, 9.5.4, 9.6.2, 9.6.4, 9.7.1	6

3	Katrain	9.1.1, 9.4.1, 9.6.1, 9.7.1	4
4	Ludhiana	9.1.1, 9.1.3, 9.2.1, 9.5.2, 9.6.2, 9.6.3, 9.7.1	7
5	Rahuri	9.1.3, 9.2.2, 9.5.2, 9.5.3, 9.5.4, 9.6.2, 9.6.4, 9.7.1	8
6	Sabour	9.1.3, 9.2.1, 9.2.2, 9.3.1, 9.5.1, 9.5.2, 9.6.3, 9.7.1	8
7	Hyderabad	9.1.2, 9.2.1, 9.5.2, 9.5.3, 9.5.4, 9.6.1, 9.6.2, 9.6.4, 9.7.1	9
8	Solan	9.2.2, 9.5.2, 9.5.4, 9.6.1, 9.6.3, 9.6.4, 9.7.1	7
9	Raipur	9.1.3, 9.2.1, 9.2.2, 9.5.2, 9.5.4, 9.7.1	6
10	Banda (BUAT)	9.1.2, 9.2.1, 9.7.1	3
11	Nagaland	9.1.2, 9.2.2, 9.3.1, 9.4.1, 9.5.2, 9.6.2, 9.6.3, 9.7.1	8
		Total	**71**

Nematology

Sr. No	Centers	Trials Allotted	No. of trials
1	Ludhiana	9.8.1, 9.9.1,9.9.2, 9.10.1,9.10.2,9.11.1,9.12.1	7
2	IIHR	9.8.1, 9.9.1,9.9.2, 9.10.1,9.10.2,9.11.1,9.12.1	7
3	IIVR	9.9.2, 9.10.1,9.10.2,9.11.1,9.12.1	5
		Total	**19**

New trials in Insect Pest management from 2018-19 onwards

9.6.2. Evaluation of different pest management modules against vector and sucking pests management of Bitter gourd

Centers allotted **IIHR, IIVR, Hyderabad, Nagaland, Rahuri, Ludhiana**

Variety – Locally available
Plot size – 5 x 8 mt
Replication – 5
Treatments – 4
Design – RBD

Treatment details

T1-Bio-intensive pest management module (BIPM)
Installation of yellow sticky trap @ 25-30/ha

- Spraying of Azadirachtin 1500 ppm @ 10 ml/lit of water at 20 DAS
- Spraying of *Lecanicillium lecanii* @ 5 g/lit at 30 DAS
- Spraying of *Beauveria bassiana* @ 5 g/lit at 40 DAS
- Spraying of Neem oil (0.5%) + *Lecanicillium lecanii* @ 2.5 g/lit at 50 DAS
- Spraying ofNeem oil (0.5%) + *Beauveria bassiana* @ 2.5 g/lit at 60 DAS
- Spraying of Neem seed powder pellets @ 30 g/lit at 70 DAS (IIHR, Bangalore will supply)

T2-Chemical pest management module (CPM)
Seed treatment with Imidachloprid 48 FS @ 5-10 g/kg of seed

- Spraying of Thiamethoxam 25 WG @ 1g/3 lit at 20 DAS
- Spraying of Cyantraniliprole 10.26 OD @ 1.8 ml/lit at 30 DAS
- Spraying of Imidachloprid 70 WG @ 1 g/12 lit of water at 40 DAS onwards till 70 DAS at 10 dates interval each

T3-Ingrated pest management module (IPM)
Seed treatment with Imidachloprid 48 FS @ 5-10 g/kg of seed and installation of yellow sticky trap @ 25-30/ha, border crop with maize

- Spraying of Azadirachtin 1500 ppm @ 10 ml/lit of water at 20 DAS
- Spraying of Thiamethoxam 25 WG @ 1g/3 lit at 30 DAS
- Spraying of Imidachloprid 70 WG @ 1 g/12 lit of water at 40 DAS
- Spraying of Cyantraniliprole 10.26 OD @ 1.8 ml/lit at 50 DAS
- Spraying of Neem oil (0.5%) + *Lecanicillium lecanii* @ 2.5 g/lit at 60 DAS
- Spraying ofNeem oil (0.5%) + *Beauveria bassiana* @ 2.5 g/lit at 70 DAS

T4-Untreated control

General practices

- Installation of cue lure trap @ 25-30/ha for all the treatments

- Apply *Bt* @ 2 g/lit as blanket spray for all the treatments if incidence of Cucumber moth, *Diaphania indica* is there.
- Apply recommended fungicides for disease management, if appeared, as blanket spray for all the treatments.
- Standard agronomic practices for all the treatments

Observation to be recorded

✓ Population of whitefly, aphids, jassids and thrips population per leaf at before and after spray (25, 35, 45, 55 & 65 days after spray)
✓ Population of natural enemies like predatory coccinellid beetle, spiders and other, if any, per plant basis
✓ Calculate protection over control (POC) for each treatment
✓ Yield data (q/ha)
✓ Benefit cost ratio

9.6.3 Evaluation of some novel insecticide molecule against whitefly of cucumber

Centers allotted: Nagaland, Sabour, Solan, Ludhiana

Variety – Locally available
Plot size – 4 x 3 mt
Replication – 3
Treatments – 8
Design – RBD

Treatment details

T1- Flonicamid 50 WG @ 0.4 g/litre
T2- Flupyrifurone 200 SL@2 ml/litre
T3- Diafenthuiron 1g/litre
T4- Acetamiprid @0.15g/ litre
T5- Spiromesifen @0.75 ml/litre
T6- Thiocloprid @0.4ml/litre
T7- Dimethoate @ 2 ml/litre
T8- Untreated contol

General practices

- Installation of cue lure trap @ 25-30/ha for all the treatments
- Apply *Bt* @ 2 g/lit as blanket spray for all the treatments if incidence of Cucumber moth, *Diaphania indica* is there
- Apply recommended fungicides for disease management, if appeared, as blanket spray for all the treatments.
- Standard agronomic practices for all the treatments agronomic practices

Observation to be recorded

✓ Population of whitefly, aphids and thrips population per leaf at before and after spray (1, 3, 5, 7 and 10 days after spray)

- ✓ Population of natural enemies like predatory coccinellid beetle, spiders and other, if any, per plant basis
- ✓ Calculate protection over control (POC) for each treatment
- ✓ Yield data (q/ha)
- ✓ Benefit cost ratio

9.6.4 Evaluation of some entomopathogenic fungi and their compatibility with neem oil against whitefly of cucumber

Centers allotted: **IIHR, Hyderabad, Rahuri, Solan**

Variety – Locally available
Plot size – 4 x 3 mt
Replication – 3
Treatments – 9
Design – RBD

Treatment details
T1- *Beauveria bassiana* @ 5g/litre
T2- *Metarhizium anisopliae* @ 5 g/litre
T3- *Lecanicillium lecanii*@ 5g/litre
T4- *Beauveria bassiana* @ 2.5 g/litre + neem oil 0.5%
T5- *Metarhizium anisopliae* @ 2.5 g/litre + neem oil 0.5%
T6- *Lecanicillium lecanii*@ 2.5 g/litre + neem oil 0.5%
T7- Neem oil @ 1%
T8- Imidacloprid 17.8 SL@ 0.33 ml/litre
T9- Untreated control

General practices
- Installation of cue lure trap @ 25-30/ha for all the treatments
- Apply *Bt* @ 2 g/lit as blanket spray for all the treatments if incidence of Cucumber moth, *Diaphania indica* is there
- Apply recommended fungicides for disease management, if appeared, as blanket spray for all the treatments.
- Standard agronomic practices for all the treatments agronomic practices

Observation to be recorded
- ✓ Population of whitefly, aphids and thrips population per leaf at before and after spray (1, 3, 5, 7 and 10 days after spray)
- ✓ Population of natural enemies like predatory coccinellid beetle, spiders and other, if any, per plant basis
- ✓ Calculate protection over control (POC) for each treatment
- ✓ Yield data (q/ha)
- ✓ Benefit cost ratio

Nematology New Trials

9.12.1 Bio-efficacy of liquid formulation of bio-pesticide*Bacillus megateruim* in the management of *Meloidogyne incognita* infecting Brinjal

Centers allotted **IIHR, IIVR, Ludhiana**

Variety : Local cultivar
Design : RBD
Replication : 3
Treatments : 7

Treatment Nos.	Treatment details
T1	Seed treatment with *Bacillus megateruim* -1% A.S. At 10 ml/kg seed
T2	T1+ Nursery bed treatment with *Bacillus megaterium* – 1% A.S. 50ml/m^2
T3	T2+ Soil drenching with *Bacillus megaterium* – 1% A.S. 5 ml/litre at 30 days interval
T4	T2+ application of 5 tons of FYM enriched with 5.0 lit of *Bacillus megaterium 1%* A.S /ha
T5	T2+ application of 5 tons of FYM enriched with 5.0 lit of *Bacillus megaterium 1%* A.S /ha + Soil drenching with *Bacillus megaterium* – 1% A.S. 5 ml/litre at 30 days interval
T6	Chemical treatment (Carbofuran at 1 kg a.i./ha)
T7	Control

Observations to be recorded

Initial soil population of nematodes in 100 CC
Root galling index (0 – 5 scale)
Nematodes per 10 g root system (final)
Soil population of nematodes in 100 CC (final)
Yield in tons/ha

9.10.2 Evaluation of talc based formulation of *Bacillus subtilis* (CRB7) in the management of *Meloidogyne incognita* infecting Cucumber

Centers allotted **IIVR, IIHR, Ludhiana**

Variety : Local cultivar
Design : RBD
Replication : 3
Treatments : 7

Treatment details:
T1- Seed treatment with *Bacillus subtilis* (CRB7) @ 20g/ kg seed
T2- Soil application of *Bacillus subtilis* (CRB7) (5 kg/ha/enriched with 2 ton of Vermi compost)
T3 - Soil drenching *Bacillus subtilis* (CRB7) @ 5 g/litre at 15 days interval.

T4 - Seed treatment with *Bacillus subtilis* (CRB7) @ 20g/ kg seed+ Soil application of *Bacillus subtilis* (CRB7) (5 kg/ha/enriched 2 ton of Vermi compost) + Soil drenching *Bacillus subtilis* (CRB7) @ 5 g/litre at 15 days interval.

T5- Vermicompost alone @ 2 ton/ha

T6- Carbofuran @ 1kg a.i/ha;

T7- Control

Observations to be recorded

Initial soil population of nematodes in 100 CC

Root galling index (0 – 5 scale)

Nematodes per 10 g root system (final)

Soil population of nematodes in 100 CC (final)

Yield in tons/ha

SESSION – X

SEED PRODUCTION

Chairperson	:	Dr. Balraj Singh, Vice Chancellor, Jodhpur University
Co-Chairperson	:	Dr. S.K. Tripathi, Nuzuveedu Seeds
	:	Dr. B.S. Tomar, Head, ICAR-IARI
Convener	:	Dr. Rajesh Kumar, Scientist, ICAR-IIVR
Rapporteur	:	Dr. Manimurgan, Scientist, ICAR-IIVR
	:	Dr. Rajinder Singh, Professor, PAU

The chairperson welcomed the delegates and highlighted the importance of quality seed production in vegetable crops. He stressed upon seed production under protected condition for better qualities and quantities. He emphasized to transfer the developed technology to farmers for better returns. Dr. H. S. Yogeesha and Dr. Rajinder Singh presented the compiled report for the year 2016-17 and 2017-18 respectively pertaining to seed production trials. The reporting percentage of trials were 100%. While reviewing the results, the chairperson and co-chairpersons said that the technical programme should be followed without any deviation and the older trials should be windup and replaced with new trials on seed production issues.

After the presentation and discussion thereon, the chairperson formulated a committee under the chairpersonship of Dr. B. S. Tomar, comprising of Drs. S. K. Tripathi, H. S. Yogeesha, Rajinder Singh, Kuldeep Thakur, Swarnalata Das, D.P. Singh, Sumati Narayan and C. Manimurugan as members for scrutinizing the results and identifying recommendations, if any, and finalization of technical programmes for the year 2018-19.

Suggestions:

During the presentation and discussion, following important suggestions were made.

1. Trials on hybrid seed production of vegetables should be included
2. Recommended technologies of seed production trials should be documented.
3. The use of protected structures should be encouraged for seed production.
4. All the results of seed production trials should invariably include the name of the vegetable varieties.

Recommendations:

The pooled results of different seed production trials conducted at various centers were scrutinized and after thorough discussion, the following recommendations were made by the committee. As suggested by DDG (Horticulture), the recommendations of experiments 6.75 and 6.77., conducted at Katrain were not included because the variety chosen for each experiment was very old.

1. Based on three years data it was concluded that transplanting of 24 or 27 days old seedlings of brinjal cv Gulabi resulted in maximum and on par seed yield (7.59 q/ha and 7.51q/ha respectively) under Hyderabad condition. Hence, it is recommended for agro-climatic condition of Zone V.
2. Sowing palak, cv. All Green in the first fortnight of October with one leaf cutting produced the highest seed yield of 29.21 q/ha with higher seed quality at Pantnagar. Hence, it is recommended for agro-climatic condition of Zone I.

3. Sowing of palak cv. All Green during October with one cutting gave a significantly higher seed yield (15.66q/ha) along with highest seed quality at Varanasi. The BC ratio was also higher. Hence, it is recommended for agro-climatic condition of Zone IV.
4. Pre-emergence application of pendimethalin @ 0.75 kg ai/ha followed by one hand weeding at 40 DAS produced maximum seed yield (14.7 q/ha) with CB ratio of 1:2.11 in green pea cv. Arkel at Pantnagar condition. Hence, it is recommended for agro-climatic condition of Zone I.
5. At the end of three year experiment, highest seed yield (9.55 q/ha) was recorded in chilli cv. LCA334 in weed free plot followed by straw mulch (8.12q/ha) at Hyderabad condition. Hence, it is recommended for agro-climatic condition of Zone V.
6. Mulching with black polythene in chilli cv. LCA 620 recorded highest seed yield (13.9q/ha) along with B:C ratio (1.02) at Lam. Hence, it is recommended for agro-climatic condition of Zone V.
7. Based on experiment results, better germination percentage with other quality traits with CB ratio of 1:1.92 were observed in seed coating with carbendazim @2g/kg seed + Imidachloprid @2ml/kg seed + Diammonium phosphate @30g/kg seed + IIHR micronutrient mixture @ 20g/kg seed in chilli cv LCA625 at Lam. Hence, it is recommended for agro-climatic condition of Zone V.
8. Foliar spray of growth retardant cycocil @ 500ppm and spacing at 60 x 30 cm increased the seed yield and quality in Okra cv. Phule Utkarsh during kharif season at Rahuri. Hence, it is recommended for agro-climatic condition of Zone VII.
9. Highest seed yield of 270.09 kg/ha was recorded with foliar spray of NAA 30 ppm at 5 days before transplanting in nursery, 25days, 45days and 65 days after transplanting in Chilli cv. Phule Jyoti at Rahuri. Hence, it is recommended for agro-climatic condition of Zone VII.
10. High quality seeds (germination %, seed weight, speed of germination, vigor index, etc.) were extracted when fruits were harvested 45 days after anthesis and allowing post-harvest ripening for 10 days before seed extraction from fruits of pumpkin cv. Punjab Samrat at Ludhiana. Hence, it is recommended for agro-climatic condition of Zone IV.

TECHNICAL PROGRAMME FOR 2018-19

Sl. No.	Trials	Code No.	Centres allotted	No. of centres	Remarks
1.	Standardization of vigour tests in vegetable seeds (2008-09)	6.60	Pondichery	1	Pondichery (tomato)*
2.	Seed coating in vegetable crops (2011-12)	6.67	Raipur	1	Raipur (Knol khol)
3.	Studies on effect of integrated weed management on quality and seed yield of vegetable crops (2013-14)	6.76	Vellanikkara	1	Vellanikkara (Bittergourd)
4.	Integrated nutrient management in chilli for seed yield and quality improvement (2014-15)	6.81	Lam	1	Lam (chilli)
5.	Physiological maturity and longevity of pumpkin seeds in relation to fruit age and duration of *in situ* storage (2014-15)	6.84	IIHR	1	IIHR (pumpkin)
6.	Influence of foliar spray of micronutrients to enhance seed yield and quality in chilli and tomato (2015-16)	6.87	Lam, Srinagar, Japalpur, Kanpur and Raipur	5	Lam (chilli), Srinagar (chilli), Japalpur (chilli), Kanpur (chilli) and Raipur (tomato)
7.	Identification of suitable area and season for seed yield and quality in okra (2015-16)	6.88	IIVR, IIHR, Ludhiana, Raipur	4	IIVR*, IIHR*, Ludhiana*, Raipur*
8.	Management of dormancy in vegetables (2016-17)	6.89	IIVR, Ludhiana, IIHR	3	IIVR (Ash gourd), Ludhiana (tinda), IIHR (Cucumber), Coimbatore (Ash gourd)
9.	Effect of drip irrigation and fertigation schedule on seed yield and quality in vegetable crops (2016-17)	6.90	Rahuri, Lam	2	Rahuri (okra var. Phule Vimukta), Lam (chilli).
10	Effect of salicylic acid in seed yield and quality in tomato during water stress period (2016-17)	6.91	Bhubaneshwar	1	Bhubaneshwar (tomato)
11.	Enhancement of storability of vegetable seeds under ambient conditions by zeolite beads (2017-18)	6.92	Lam, IIVR, Bhubaneswar, Coimbatore, Vellanikkara.	5	Lam (Chilli), IIVR (Pumpkin), Bhubaneswar (Bittergourd), Coimbatore (Ridge gourd), Vellanikkara (Ridge gourd)
12.	Standardization of seed production technology for Bottle gourd (2017-18)	6.93	PAU, Jabalpur	3	PAU (bottle gourd), Jabalpur (bottle gourd)
13	Effect of abscisic acid on seed yield and seed quality of cowpea (2017-18)	6.94	Bhuvaneswar, Raipur, Vellanikkara	3	Bhuvaneswar (cowpea), Raipur (cowpea), Vellanikkara (cowpea).
			Total	30	

Sl. No.	Trials	Code No.	Centres allotted	No. of centres	Remarks
New trials (proposed)					
14.	Studies on organic seed production of radish (2018-19)	6.95	Solan and Srinagar	2	Crop: Radish cv. Chinese Pink
15.	Effect of foliar NPK (19:19:19) and micronutrient application on seed yield and quality of vegetable pea (2018-19)	6.96	Ludhiana, Kanpur, IIVR and Raipur	4	Centers will select their own variety for experiment
16.	Standardization of planting ratio (Female:Male) and spacing for quality seed production of Pusa Snowball hybrid-1 (2018-19)	6.97	Katrain, Solan	2	Crop: Cauliflower cv. Pusa Snowball hybrid-1
17.	Effect of foliar spray of micronutrient and secondary nutrient mixture on seed yield and quality of okra (2018-19)	6.98	Hyderabad, Pondicherry and Vellanikkara	3	Crop: Okra, Centers will select their own variety for experiment
17.	Standardization of initiation of male flower in seed production of parthenocarpic cucumber (2018-19)	6.99	IIHR, Bhubaneswar (OUAT) and Pantnagar	3	Crop: Cucumber cv. Pant Parthenocarpic cucumber – 1
			Subtotal	**14**	
			Grand total	**44**	

*The third year trial continued under the technical programme of 2017-18.

Centre wise allotment of trials for 2015-16

Sl. No.	Centre	Code No. of the trials	Total No. of allotted trials
1.	Bhubaneswar	691, 6.92, 6.94, 6.99	4
2.	Coimbatore	6.92	1
3.	IIHR	6.84, 6.88, 6.89, 6.99	4
4.	IIVR	6.88, 6.89, 6.92, 6.96	4
5.	Jabalpur	6.87, 6.93	2
6.	Kanpur	6.87, 6.96	2
7.	Katrain	6.97	1
8.	Hyderabad	6.98	1
9.	Lam	6.81, 6.87, 6.90, 6.92	4
10.	Ludhiana	6.88, 6.89, 6.93, 6.96	4
11.	Pantnagar	6.99	1
12.	Puducherry	6.60, 6.98	2
13.	Raipur	6.67, 6.87, 6.88, 6.94, 6.96	5
14.	Rahuri	6.90	1
15.	Solan	6.95, 6.97	2
16.	Srinagar	6.87, 6.95	2
17.	Vellanikkara	6.76, 6.92, 6.94, 6.98	4
		TOTAL	**44**

NEW TRIALS (2018-19)

6.95 Studies on organic seed production of radish

Centers: Solan and Srinagar

Treatments

1. Control (No nutrient will be added while land preparation)
2. FYM @ 20 ton/ha
3. Vermicompost @ 8 ton/ha
4. FYM 10 ton/ha + vermicompost 4 tons/ha
5. FYM 20 ton/ha + Vermiwash @ 1:1 (v/v - water+vermiwash) spray (Before flowering, at flowering and 15 days post flowering)
6. Vermicompost @ 8 ton/ha + Vermiwash @ 1:1 (v/v - water+vermiwash) spray (Before flowering, at flowering and 15 days post flowering)
7. FYM 10ton/ha + Vermicompost 4 ton/ha + Vermiwash @ 1:1 (v/v - water+vermiwash) spray (Before flowering, at flowering and 15 days post flowering)

Plot size: 3x2.7m

Spacing: 60x45cm

Replications: 3

Design: Randomized block design (RBD)

Remarks:

- Treatment doses have been finalized on N equalent basis
- Soil sample and other organic amendments will be tested for nutrient status
- For production of mother root, NPK @ 60:40:40 may be supplemented by FYM and or Vermicompost
- The trial site should meet the requirement of organic production

Variety: Chinese Pink (Seed source - Solan)

Observations

1. Root weight (kg/root)
2. Root length (cm)
3. Root shoot ratio
4. Pod length (cm)
5. Number of branches per plant
6. Number seeds per pod
7. Seed yield per plant
8. Seed yield per plot (kg)
9. Seed yield per hectare (q/ha)
10. 1000 seed weight (g)
11. Germination (%)
12. Vigour index I
13. Vigour index II

6.96: Effect of foliar NPK (19:19:19) and micronutrient application on seed yield and quality of vegetable pea

Centers: Ludhiana, Kanpur, IIVR and Raipur

Treatments:

1. Recommended NPK + Foliar spray of NPK @ 1% before flowering
2. Recommended NPK + Foliar spray of NPK @ 2% before flowering
3. Recommended NPK + Foliar spray of NPK @ 1% before and after flowering
4. Recommended NPK + Foliar spray of NPK @ 2% before and after flowering
5. Recommended NPK + Foliar spray of IIHR micronutrient mixture @0. 25% before flowering
6. Recommended NPK + Foliar spray of IIHR micronutrient mixture @0. 25% before and after flowering
7. Recommended NPK + Foliar spray of IIHR micronutrient mixture @0. 25% before flowering + foliar spray of NPK @ 1% before flowering
8. Recommended NPK + Foliar spray of IIHR micronutrient mixture @0. 25% before flowering + foliar spray of NPK @ 2% before flowering
9. Recommended NPK + Foliar spray of IIHR micronutrient mixture @0. 25% before and after flowering + foliar spray of NPK @ 1% before and after flowering
10. Recommended NPK + Foliar spray of IIHR micronutrient mixture @0. 25% before and after flowering + foliar spray of NPK @ 2% before and after flowering
11. Control (Recommended NPK)

(Before flowering and after flowering means for early varieties, it should be 30 and 60 days after sowing and for late varieties, 40 and 80 days after sowing)

Plot size: 3.0 x 3.0 m
Replications: 3
Design: Spilt plot
NPK 19:19:19 as foliar spray

Observation to be recorded

1. Days to 50% flowering
2. Plant height (cm) at the time of harvest
3. Pod length (cm)
4. Number of pods per plant
5. Number seeds per pod
6. Raw seed yield (kg/plot)
7. Graded seed yield (kg/plot)
8. Seed yield (q/ha)
9. 100 seed weight (g)
10. Germination (%)
11. Vigour index I
12. Vigour index II

6.97. Standardization of planting ratio (Female: Male) and spacing for quality seed production of Pusa Snowball hybrid-1 (2018-19).

Crop: Cauliflower cv. Pusa Snowball hybrid-1
Centers: Katrain, Solan

Treatments
Planting ratio
1:1 and 2:1
Spacing
60×60cm, 60×45cm and 60×30cm
Experiments will be conducted in isolation in both the ratios
Replications: 3
Plot size:4.8m×5.4m
Seed source: Katrain center

Observations to be recorded

1. Pod length (cm)
2. Percentage of pod set
3. Number of seed per pod
4. Seed yield per plant (g)
5. Seed yield per plot (kg)
6. Seed yield per hectare (q/ha)
7. 1000 seed weight (g)
8. Germination (%)
9. Vigour index I
10. Vigour index II

6.98. Effect of foliar spray of micronutrient and secondary nutrient mixture on seed yield and quality of okra

Centers: Hyderabad, Vellanikkara and Pondicherry

Treatments
1. Sampoorna KAU mixture @ 5g/lit at 30, 45 and 60 days after sowing
2. KAU vegetable mixture @ 5g/lit at 30, 45 and 60 days after sowing
3. IIHR micronutrient mixture @ 5g/lit at 30, 45 and 60 days after sowing
4. Stanes @ 5ml/lit at 30, 45 and 60 days after sowing
5. Control

Micronutrient and secondary nutrient mixture provided by ICAR-IIHR and Vellanikkara centers
Plot size: 3mx3m
Number of replication: 4
Observation to be recorded

1. Plant height (cm)
2. Number of pods per plant
3. Seed yield per pod
4. Seed yield (kg/plot)
5. Seed yield (q/ha)
6. Virus incidence will be recorded with the help of pathologist
7. 100 seed weight (g)
8. Germination (%)
9. Vigour index I
10. Vigour index II

6.99. Standardization of initiation of male flower in seed production of parthenocarpic cucumber

GA_3 sprays have been made to induce staminate flowers in gynoecious lines. Silver nitrate at 500 mg/l has been reported to be as effective as GA_3 in inducing male flowers on gynoecious lines of cucumber . However, in muskmelon foliar sprays of Silver thiosulphate at 400 mg/l was found best for induction of male flower on gynoecious lines.

Centers: IIHR, Bhubaneswar (OUAT) and Pantnagar

Treatments

1. Foliar spray of 250 ppm of $AgNO_3$
2. Foliar spray of 500 ppm of $AgNO_3$
3. Foliar spray of 750 ppm of $AgNO_3$
4. Foliar spray of 50 ppm of GA_3
5. Foliar spray of 100 ppm of GA_3
6. Foliar spray of 150 ppm of GA_3
7. Foliar spray of silver thiosulphate 1mM
8. Foliar spray of silver thiosulphate 3mM

Stage of foliar spray:

Foliar spray will be done at two stages; one at 2 true leaf stage and second one at 4 true leaf stage for all the treatments

10 plants per treatments

Number replication: 3

Variety: Pant Parthenocarpic cucumber 1

Seed source: Pantnagar

Observation to be recorded

1. Days taken for appearance of male flower
2. Days taken for appearance of female flower in seed parent
3. Number of female flower/plant
4. Number of male flower/plant
5. Number of fruits per plant
6. Fruit length (cm) at time of final harvest
7. Fruit girth (cm) at time of final harvest
8. Seed yield per plant
9. Seed yield (kg/plot)
10. Seed yield (q/ha)
11. 100 seed weight (g)
12. Germination (%)
13. Vigour index I
14. Vigour index II

SESSION–XI

Breeder Seed Production and Price Review

Chairperson	:	Dr. B. Singh, Director, ICAR-IIVR, Varanasi
Co-chairperson	:	Dr. A.T. Sadashiva, ICAR-IIHR, Bengaluru
Convener	:	Dr. Manimurgan, Scientist, ICAR-IIVR, Varanasi
Rapporteur	:	Dr. D. P. Singh, CSAUA&T, Kalyanpur
	:	Dr. Vikas Singh, Senior Scientist, ICAR-IIVR, Varanasi

In the opening remarks, the Chairman welcomed the participants and emphasized the importance of breeder seeds and its conversion to the foundation and certified seeds thereby enhancement in seed replacement rate (SRR). The chairman also stressed encouraging the new varieties/hybrids in the national seed production chain and urged the agencies to include the new varieties/hybrids in their indents for the increased returns to the farmers.

After his opening remarks, the chairperson asked Dr. Rajesh Kumar to present the status of breeder seed production for the year 2016-2017 and 2017-2018 at various centres. Dr. Kumar presented the seed production status of 19 centres producing seeds of 119 varieties of 33 vegetable crops during 2016-17. A total of 35669.243 kg breeder seeds was produced against the indent of 14955.940 kg for the year 2016-2017. Further, during the year 2017-18, 21 centers were given responsibility for breeder seed production of 193 varieties of 36 vegetable crops where 34426.840 kg breeder seeds was produced so far against the indent of 20615.990 kg. Although the status of breeder seeds of many vegetable crops were awaited for the current cropping season (2017-18) from many centres. It is expected that the targeted quantity will be fulfilled once the reports from the all the centres are available. Some of the centres have produced additional quantities of seeds for the indented varieties along with some non-indented varieties as well.

Suggestions:

1. A list of new varieties/hybrids may be prepared by all the centres and communicated to the Secretary/Director (Agriculture/Horticulture) of the concerned state government with a copy to the Deputy Commissioner (QC), DAC, MoAFW, Govt. of India and to the PC Cell at ICAR-IIVR, Varanasi for the inclusion of new varieties/hybrids in breeder seed indent.
2. Status of the nucleus seeds of vegetable varieties/parental lines may also be provided by the centres.
3. For non-lifting of the breeder seeds by the indenter, the concerned centres should inform to the DAC with a copy to the Project Coordinator.
4. Breeder seeds should be produced at the source centre of the varieties/hybrids under the strict supervision of the concerned breeder/successor.
5. Non-performing centres should be cautioned for better performance.
6. Wherever the nucleus seed availability is a problem, the centre may arrange the seeds from the NBPGR or other centres having the seeds.

After the presentation of breeder seed production reports, the prices of breeder seeds were reviewed. The prices were revised considering the input cost of seed production including drastic increase in the labor wages, fuels, plant protection chemicals, etc. The house agreed upon the increase of the prices of the breeder seeds of different vegetable crops. Accordingly, the following breeder seed price of different vegetable crops was proposed for the year 2018-19.

Table: Breeder seed prices of vegetable crops (2018-19)

S.N.	Crop	Existing Rate (Rs/kg) as per XXXV Group Meeting, IIHR, Bengaluru (2017)	Proposed Rate (Rs/kg) as per XXXVI Group Meeting, RARI, Durgapura (2018)
1.	Amaranthus	700	900
2.	Ash gourd	1400	2000
3.	Bitter gourd	1500	2200
4.	Bottle gourd	1100	1600
5.	Brinjal	2650	4000
6.	Cabbage	2650	4000
7.	Capsicum/Paprika	11000	15000
a)	Carrot (Temperate)	3300	4500
8. b)	Carrot (Tropical)	1650	2500
9.	Cauliflower (Early/ Mid-early/ Mid)	3550	4500
10.	Chilli	2200	3000
11.	Cluster bean	650	800
12.	Coriander	500	600
13.	Cowpea	600	650
14.	Cucumber	2500	3000
15.	Cumin	1000	1100
16.	Dolichos/Lablab bean	400	500
17.	Fennel	500	600
18.	Fenugreek	400	500
19.	French bean	400	450
20.	Garden pea	300	330
21.	Garlic	250	350
22.	Knol Kohl	2650	3500
23.	Late Cauliflower	5500	7000
24.	Long melon	1400	2000
25.	Methi (Kasuri)	450	500
26.	Moringa seed	5000	7000
27.	Muskmelon	1700	2200
28.	Okra	550	600
29.	Onion	2450	3000
30.	Palak	350	350
31.	Pumpkin	1500	2000
32.	Radish	800	1000
33.	Ridge gourd	1200	1800
34.	Snake gourd	1500	2000
35.	Sponge gourd	1200	1800
36.	Summer squash	1500	2200
37.	Tinda (Round melon)	1200	1800
38.	Tomato	3100	5000
39.	Turnip	1550	2000
40.	Water melon	3100	4500

SESSION – XII

Public Private Interface

Chairperson	:	Dr. Brahma Singh, Ex. Director, DRDO
Co-Chairperson	:	Dr. C. S Pathak, Nath Bio-gene (I) Ltd.
Convener	:	Dr T S Aghora, Principal Scientist, ICAR-IIHR
Rapporteurs	:	Dr T S Aghora, Principal Scientist, ICAR-IIHR Dr. Pradip Karmakar, Scientist, ICAR-IIVR,Varanasi

At the outset, the Chairperson emphasized the importance of this session and welcomed all the delegates. He appreciated the role of public and private sector organizations in fulfilling the seed requirement of farmers particularly in vegetables. He was appreciating the private industries in their role in supply of farm inputs like fertilizers, pesticides, protected cultivation material etc apart from seeds.

Dr. C. S Pathak, the Co-Chairman of the session emphasized on the new challenges, which need immediate attention like TOSPO in Tomato, LCV in Chilli, ELCV in Okra, WBNV in cucurbits, emerging pests like Tuta in tomato etc. Proposals should be prepared and collaborative projects to be initiated between private and public institutions. For this work, few institutes which have the required facilities are to be identified.

Dr Srishaila from Indo American Hybrid Seed Company, Bengaluru suggested the need for collaborative research in line with World Veg Center, Taiwan. Dr Sadashiva, Head Div of Veg Crops IIHR, Benagluru opined that the resistant material are identified and can be utilized. Further, he told the house that "Brain storming on begomo viruses and TOSPO" will be organized during June 2018 at IIHR and the proposals may be finalized before that.

Dr R. S. Saini, Dean, College of Agriculture, Lalsot, Dausa suggested positively to have collaborative projects by sharing the benefits. Dr Manoj from Ankur seeds told the house that the Coding and decoding of tested entries to be done every year and it was decided to collect the testing fees in advance. Dr Vidhyanchal Prasad from Metahelix mentioned about proper conduct of trials for which Chairman informed that these have been already taken care in the technical programme.

Dr Kirti Singh, advised that both public and private should work together for the benefit of farming community keeping national interest on priority. He also suggested that DDG (HS) might convene a meeting of few private entrepreneurs and public institutions to finalize the further course of action for effective implementation of PPP.

Dr. Kalloo suggested increasing the efficacy of hybrid technology using molecular breeding and also funding for participatory approach to be worked out. Dr. D P Ray opined that technology transfer and PHT needs attention.

Action Points: Project proposals to be prepared on following areas and invite the private companies to take part in the projects.

SN	Project	Institutions
1.	LCV in Chilli	IIHR, IIVR and PAU
2.	TOSPO in tomato	IIHR and IIVR
3.	ELCV in okra	IIVR, IARI and IIHR

The session ended with a vote of thanks to the chair.

SESSION-XIII

Protected Cultivation

Chairperson	:	Dr. Brahma Singh, Ex. Director, DRDO
Co-Chairperson	:	Dr.D.K.Singh, Prof., GBPUA&T
Convener	:	Dr. R. N. Prasad, Principal Scientist, ICAR-IIVR
Rapporteur	:	Dr. S.S.Hebbar, Principal Scientist, ICAR-IIHR
	:	Dr. S.K.Sanwal, Principal Scientist, ICAR-CSSRI

The Chairperson Dr. Brahma Singh in his opening remarks emphasized importance of research on protected cultivation for enhancing the yield, quality and round the year supply of vegetables. In the discussion after presentation, following issues pertaining to protected cultivation that need to be addressed to provide solutions to the farmers were emerged.

Suggestions:

- Efforts should be made to develop suitable varieties/ hybrids of important vegetable crops for protected cultivation by the public institutes.
- It was suggested that different structures need to be evaluated for different region and season. Protected structure need be designed considering the agro-climatic condition of the areas.
- Root knot nematode is a serious problem associated with the protected cultivation and therefore trials may be intensified on nematode management.
- Pollinators for protected cultivation need to be developed exploiting existing native bumble bees and other pollinators.
- A network project may be proposed to evolve suitable varieties and their production technologies for protected cultivation.
- It was suggested that more crops need to be tried under protected cultivation apart from presently grown crops like parthenocarpic cucumber, bell pepper and tomato. Crops like Brinjal and Okra can also be taken up in protected structure to reduce the load of pesticide residues in the product. Experiment under insect proof net house or brinjal and okracan be planned.
- It was suggested that rain shelter should be evaluated to grow different vegetables in heavy rain fall areas, considering high price of vegetables in rainy season.
- It was suggested that cherry tomato variety Pusa Cherry-1 and cucumber variety Pusa Parthenocarpic Cucumber-6 and any other polyhouse varieties developed in NARS may be evaluated in this project.
- Data sheet should be provided to the centers for every experiment so that there is uniform reporting of data.

Chairman formulated the following committee to draw recommendation from the results presented for the year 2016-17 & 2017-18 and also to formulate the technical programme for the year 2018-19.

1. Dr. Balaraj Singh : Chairman
2. Dr. B.S. Tomar : Member
3. Dr. R.N. Prasad : Member
4. Dr. D.K. Singh : Member
5. Dr. S.S.Hebbar : Member

AICRP recommendation from Protected Cultivation session (2016-17 and 2017-18)

- At Jabalpur, maximum yield (865.94 q/ha) net return (Rs 8,53,717/ha) and B:C ratio (4.14) was recorded in the treatment $V_1S_1P_1$ (Hybrid Sun Cherry Extra Pure+ 100X 45 cm + Pinching & staking) in naturally ventilated polyhouse condition. Hence it is recommended for Keymore Plateau & Satpura Hills Agro-climatic zone of Madhya Pradesh.
- At Jabalpur, it is observed that the maximum yield (200.0 q/ha) along with a net return Rs 2,27,680/ha and B:C ratio of 4.15 was recorded when hybrid tomato Arka Rakshak was grown under Rain Shelter with a spacing of 100cm x60 cm. Hence it is recommended for Keymore Plateau and Satpura Hills Agro-climatic zone of Madhya Pradesh.

TECHNICAL PROGRAMME 2018-19

Sl. No.	Area of research and experiment	Code No.	Centres allotted	No. of Centres
Protected Cultivation				
1	Standardizing the production technology for high value **bell pepper**	5.31	Srinagar	1
2	Production of **Cherry tomato** under protected cultivation	5.34	Jabalpur, Jammu , Mukteshwar, Palampur,	4
3	Protected cultivation of **tomato** under rain shelter during kharif season	5.39	Vellanikkara,	1
4	Protected cultivation in parthenocarpic **cucumber**	5.39.1	Coimbatore, Hisar, IIHR, IIVR, Jorhat, Mukteshwar, Palampur, Pantnagar	8
5	Protected cultivation of **Tomato** under natuarally ventilated polyhouse/insect proof nethouse/shadehouse	13.1	CPCT-IARI, Hisar, IIHR, IIVR, Palampur, Pantnagar, Raipur, Samastipur,	8
6	Fertigation studies in parthenocarpic **cucumber**	13.2	CPCT-IARI, IIHR, IIVR, Palampur, Ludhiana, Pantnagar, Srinagar	7
New Experiment				
7	Studies on micro nutrient management in polyhouse grown **green capsicums** (2018-19)	13.3	IIVR, IIHR, Ludhiana	3
	TOTAL			**32**

Centre wise allotment of trials for 2015-16

Sl. No.	Centre	Code No. of the trials	Total No. of allotted trials
1	Coimbatore	5.39.1	1
2	CPCT-IARI	13.1, 13.2	2
3	Hisar	5.39.1, 13.1	2
4	IIHR	5.39.1, 13.1, 13.2, 13.3	4
5	IIVR	5.39.1, 13.1, 13.2, 13.3	4
6	Jabalpur	5.34	1
7	Jammu	5.34	1

Sl. No.	Centre	Code No. of the trials	Total No. of allotted trials
8	Jorhat	5.39.1	1
9	Ludhiana	13.2, 13.3	2
10	Mukteshwar	5.34, 5.39.1	2
11	Palampur	5.34, 5.39.1, 13.1, 13.2	2
12	Pantnagar	5.39.1, 13.1, 13.2	4
13	Raipur	13.1	3
14	Pusa (Samastipur)	13.1	1
15	Srinagar	5.31, 13.2	1
16	Vellanikkara	5.39	1
		TOTAL	**32**

New Experiment

13.3 Studies on micro nutrient management in poly house grown green capsicums (2018-19)

Centres: IIVR, IIHR, Ludhiana

Crop: Capsicum
Variety : Popular greenhouse hybrid of the region
Treatments : Five

T1: Soil application of Fe, Zn, B
T2: Fertigation of EDTA of Zn and Fe and Solubor at weekly interval
T3: Foliar application of vegetable special at two weekly interval @ 5g/litre
T4: Foliar application of chelated combo micronutrients at two weekly interval @1g/L
T5: Control (No micronutrient application)

Replication : Four
Design : RCBD

Common Practices:

1. FYM @ 50t/ha
2. Total NPK : 200:100:250 kg NPK/ha

a. Basal dose: 40:20:50 kg NPK/ha
b. Fertigation: 160:80:200 kg NPK/ha

3. $MgSO_4$ @7.5kg/week/ha
4. $CaNO_3$ @ 5kg/week/ha
5. $CuSO_4$, MnSO4, Sodium molybdate @ 20g/week/ha each

Observations to be recorded

Type of structure		
Date of sowing/ transplanting		
Initial soil NPK and micronutrient status		
Temperature and RH data		
Blossom end rot and micronutrient deficiency symptom incidence observation		
Nematode infection at final pulling		
Any severe problem with the crop (disease/ insect incidence)		
Is the experiment is reliable		
Any other comment		

	1	2	3	4	5	6	7	8	9
treatment	Days to first harvest	Number of fruits/ plant (Average of 5 plants)	Avg. Fruit weight (g) (Avg of 5 fruits	Equatorial diameter of fruit (cm)	Radial diameter of fruit (cm)	Plant height final harvest (m)	Yield per plant (Kg)	Yield per plant (q/ha)	B:C ratio
T1 and so on									

Scientists associated/center in-charges in protected cultivation experiments

SN	Center	Name	E-mail	Contact no.
1	Coimbatore-(TNAU)	Dr.Rajashri V		9443338837
2	CPCT-IARI	Dr.Singh P.K.		8130561907
3	CPCT-IARI	Dr.Awani Kumar Singh		9013439110
4	Hisar-(CCSHAU)	Dr.Duhan DS		9416397542
5	IIHR	Dr.Shankara Hebbar	hebbar@iihr.res.in	9449105802
6	IIVR	Dr.Prasad RN	rnprasad_zcu@yahoo.co.in	9455387129
		Chaurasia SNS	chaurasiaiivr@yahoo.com	
		Anant Bahadur	singhab98@gmail.com	
7	Jabalpur (JNKVV)	Dr.Naidu. AK	drnaiduak@gmail.com	9425864420
8	Jammu(SKUAT)	Dr.Gupta RK		9419181522
9	Jorhat (AAU)	Dr.Gagoi S	saileng63@rediffmail.com	9435514466
10	Ludhiana (PAU)	Dr.Kulbir singh		8146344445
11	CITH-Muktheshwar	Dr.Raj Narayan	rajnarayan882013@gmail.com	9536659949
12	Palampur (CSKHPKV)	Dr.Akhilesh Sharma	assharmaakhil1@gmail.com	9816612008
13	Pantnagar (GBPUAT)	Dr.Singh DK		9412931556
14	Pusa (Samastipur) (RAU)	Dr.Udit Kumar	udithort@gmail.com	9431958567
15	Raipur (IGKV)	Dr.Dhananjaya Sharma	dsharma_hort@yahoo.com	9425213533
16	Sabour(BAU)	Dr. Randhir Kumar	randhirvs@gmail.com	9431384534
17	Solan (HPKV)	Dr.Kanwar HS	vgcuhf@yahoo.com	9418311584
19	Srinagar (SKUAT)	Dr K P Wani	kauserpraveen28@gmail.com	9419060978

Plenary session

Chairperson	:	Dr. A.K. Singh, DDG (HS), ICAR, New Delhi
Co-Chairperson	:	Dr T. Janakiram, ADG (HS), ICAR, New Delhi
		Dr B. Singh, Director, ICAR-IIVR, Varanasi
	:	Dr. A.B. Rai, I/c PC, ICAR-IIVR, Varanasi
Rapporteur:	:	Dr. S.K. Verma, Scientist, ICAR-IIVR, Varanasi
	:	Dr B.K. Singh, Scientist, ICAR-IIVR, Varanasi

To begin with, Dr. A.K. Singh, DDG (HS), ICAR, New Delhi welcomed all the participants and expressed his satisfaction for the deliberations which were held during the 36th AICRP-VC meet. He stressed on the need of promoting protected cultivation of horticultural crops, especially vegetables being high value cash crop and for quality seed production. He also emphasized for development and promotion of hybrid cultivars and seed. The Chairperson called for the session wise presentation of the programmes. After each presentation & discussion, the following points emerged:

Session II: Collection, Evaluation, Conservation and Utilization of Germplasm

Presented by: Dr D. R. Bhardwaj (IIVR, Varanasi)

1. A network programme should be initiated for evaluation of germplasm with special focus on national problems in vegetable crops like leaf curl in chilli, tospo virus in tomato, YVMV and ELCV in okra etc. for biotic stresses; heat and moisture stress under abiotic stresses and quality traits like TSS, β carotene, lycopene, capsaicin etc.
2. All the centers are suggested to take the IC number of germplasm/lines with the material generated through pre-breeding.
3. The trials for biotic stresses should be carried out at hot spots and for abiotic stresses at centres having adequate infrastructure facilities.
4. The trait specific accessions and more diverse germplasm within the wild species should be collected in future exploration programmes in collaboration with ICAR - NBPGR,
5. Elite genotypes identified should be distributed among the breeders for utilization in the breeding programme through MTA.

Session III: Varietal Evaluation

Presented by: Dr. P. Karmakar, IIVR, Varanasi

1. Trials should be conducted by the centre in suitable season following recommended package of practices.
2. In case of brinjal trials, the centre where the bacterial wilt is a severe problem, only bacterial wilt resistant trial should be allotted instead of varietal trial.
3. The centre reporting low yield/poor performance of the trials must justify for the cause of failure/poor yield to PC cell.
4. Breeders should ensure to supply pure seeds of the entries for evaluation trials.

Session IV: Hybrid Evaluation

Presented by: Dr. N. Rai, PS, IIVR, Varanasi

1. In many cases, seeds of entries in AVT-I onwards are not being supplied by developing centre /private companies. Therefore, timely supply of seeds for experimental trials should be ensured.

2. The coding of entries done by PC cell should be decoded every year during the annual workshop so that each developing centre/ private companies will be able to know the performance of their entries in different zone of the country. The decoding of entries will also facilitate in ranking of hybrids and its comparison with the checks.
3. The data generated for performance of varieties/hybrids being tested by AICRP (VC) at different location of a particular state should also be accepted by the respective state Governments to avoid the duplication of the testing being mandated by some of the states. PC should take this matter to ICAR headquarter and there should common consensus on this issue between center and states.
4. In recording ancillary observations, the guidelines set by AICRP (VC) while planning experiments, should be followed stringently for avoiding confusion at the time of compilation and reporting of data.
5. The reason for failure of trials should be communicated immediately to the PC Cell with proper justification and appropriate photographs which should be reflected in the final reports.

Session V: Evaluation for biotic and abiotic stresses

Presented by: Dr. V. Singh, IIVR, Varanasi

1. Hybrid resistant trial of okra must be shifted to resistant trial for better comparison.
2. There should be trials on abiotic stresses such as heat tolerance, low and excess moisture stress tolerance keeping in view the climate change scenario.
3. The hybrids and open pollinated varieties should not be evaluated together in a single trial as the yield potential of hybrids/varieties is different.

Session VI: Vegetable Production

Presented by: Dr. S.K. Singh, IIVR, Varanasi

1. Compilation of technologies of vegetable production recommended by AICRP.
2. Variety name should be indicated during conclusion of INM trials.

Session VII: Disease Management

Presented by: Dr. A.N.Tripathi, ICAR-IIVR, Varanasi

- B:C ratio may be worked out.
- Residue analysis should be compulsory for all the trials.
- Compilation of technologies of disease management recommended by AICRP-VC.

Session VIII: Physiology, Biochemistry and Processing

Presented by: Dr. S. Singh, ICAR-IIVR, Varanasi

8. To minimize the error in biochemical estimations, standard protocols should be followed at all the centres as per AOAC guidelines.
9. All entries of AVT-II trials should be included for biochemical estimations.

Session IX: Insect Pest Management

Presented by: Dr. M. Gowda T, Scientist, IIVR, Varanasi

1. Residue level should be confirmed in all IPM trials for the best treatment at the time of concluding the trials.
2. Compilation of technologies of insect pest management recommended by AICRP-VC.

Session X: Seed production

Presented by: Dr. Manimurgan, IIVR, Varanasi

1. Compilation of technologies of seed production recommended by AICRP-VC.

Session XI: Breeder seed production and price review

Presented by: Dr. Rajesh Kumar, IIVR, Varanasi

2. All the centers should try to achieve the target of seed production.

Session XII: Public Private Partnership

Presented by: Dr T S Aghora

1. Project proposals should be prepared on LCV in Chilli, TOSPO in tomato and ELCV in okra and invite the private companies to take part in the projects.

Session XIII: Protected Cultivation

Presented by: Dr S.S. Hebbar (IIHR, Bengaluru)

1. All the recommendations must include the name of the variety/hybrid and B:C ratio.
2. Root knot nematode is a serious problem associated with the protected cultivation and therefore trials may be intensified on nematode management.

A total of twelve varieties/hybrids (seven varieties: one each of brinjal long-type, brinjal round - type, Cowpea (Bush Type), dolichos pole-type, Sponge gourd, Cucumber and Mustard Green; Three hybrids- one each of chilli, bitter gourd, sponge gourd and two resistant lines - one in TOLCV tolerant line of tomato and one in YVMV tolerant line of okra) were recommended.

Dr A.K.Singh (DDG, HS) in his concluding remarks stressed on segment-wise trial, status report of pesticide residue, value based pricing of breeder seed, promotion of elite lines for registration, proposal for CVRC notification, development of variety/hybrid suitable for processing, technology impact analysis, multi-layered gardening and active participation in social media for transfer of technology.

The session ended with a vote of thanks by Dr AB Rai (PC I/c, AICRP-VC) to the chair.

VARIETAL IDENTIFICATION COMMITTEE

Proceedings

A committee was constituted under the chairmanship of ADG (HS) comprising of following members to identify the variety(ies)/ hybrid(s) for release:

1.	Dr. T. Jankiram, ADG (HS)	:	Chairman
2.	Dr. K.V. Peter	:	Member
3.	Dr. K.E. Lawande	:	Member
4.	Dr. Brahma Singh	:	Member
5.	Dr. A.T. Sadashiva	:	Member
6.	Dr. A.S. Dhatt	:	Member
7.	Dr. C.S. Pathak	:	Member
8.	Dr. T.K. Behra	:	Member
9.	Dr. M.N. Bhelakar	:	Member
10.	Dr. Rajesh Kumar	:	Member
11.	Dr. B. Singh	:	Member Secretary

The committee met on 19th May, 2018 and critically scrutinized the entries of all the trials completing AVT-II stage and made recommendations using the following criteria.

An entry performing superior for at least two years at a minimum of two locations and at least in one zone has been considered for recommendation. The significantly superior entry from the best check with respect to yield along with market driven quality parameters was also considered. The entry with minimum benchmark yield for respective vegetable crops was also taken into the consideration for recommendation.

The committee decided to finalize the identification process based on the information available.
The committee reviewed the data for the year, 2014-15, 2015-16 and 2016-17 thoroughly and following entries were identified for release and notification:

S. No.	Crop	Trial	Code	Name of the entry	Source	Zone
Variety						
1.	Brinjal Long	Variety evaluation trial	2014/BRLVAR-3	DBL-175	IARI	VI, VII
2.	Brinjal Round	Variety evaluation trial	2014/BRRVAR-3	IC-0598429	CHES, Bhubaneswar	V
3.	Cowpea (Bush Type)	Variety evaluation trial	2014/COPVAR-4	CP-55	IARI	VI
4.	Dolichos Bean (Pole Type)	Variety evaluation trial	2014/DOLPVAR-1	DB-10	IARI	VII
5.	Sponge gourd	Variety evaluation trial	2014/SPGVAR-1	VRSG-1	IIVR	IV
6.	Cucumber	Variety evaluation trial	2014/CUCUVAR-1	DC-83	IARI	IV
7.	Mustard Green	Variety evaluation trial	2014/MGVAR-1	UHF VR-12-1	Ranichauri	III

Hybrid						
1.	Chilli	Hybrid Evaluation Trial	2014/CHIHYB-3		-	IV
2.	Bitter gourd	Hybrid Evaluation Trial	2014/BIGHYB-2	NBIH-2009	Nuzi Veedu Seeds	IV
3.	Sponge gourd	Hybrid Evaluation Trial	2014/SPGHYB-2	VRSGH-1	IIVR	IV
Resistance varietal trial						
1.	Tomato (ToLCV)	Resistant Evaluation Trial	2014/TOLCVRES-5		-	VIII

All the concerned orgnisations have to provide the detail profile of each entry (trait specific characters, yield potential, resistance to abiotic and biotic factors etc.) with good quality photographs and IC number to AICRP (VC), IIVR, Varanasi for record and onward transmission to competent authorities.

Decoding of the entries at Durgapura 2017-18

VARIETAL TRIALS

1. Brinjal (Long) AVT-II

Sl. No.	Entry	CODE	Year	Source
1.	HABL-40	**2014/BRLVAR-2**	2014	Ranchi
2.	KS-516	**2014/BRLVAR-4**	2014	Kalyanpur
3.	DBGL-164	**2014/BRLVAR-1**	2014	IARI
4.	DBL-175	**2014/BRLVAR-3**	2014	IARI

2 Brinjal Round AVT-II

S.No.	Entry	CODE	Year	Source
1.	IC-0598429	**2014/BRRVAR-3**	2014	CHES Bhubaneshwar
2.	IC-0598430	**2014/BRRVAR-2**	2014	CHES Bhubaneshwar
3.	KS-421	**2014/BRRVAR-1**	2014	Kalyanpur
4.	JBR-06-8	**2014/BRRVAR-4**	2014	Junagadh

3 Tomato (Determinate) AVT-II

Sl. No.	Entry	CODE	Year	Source
1.	VTG 125	**2014/TODVAR-6**	2014	VPKAS
2.	VTG 1310	**2014/TODVAR-4**	2014	VPKAS
3.	HADT-313	**2014/TODVAR-5**	2014	Ranchi
4.	BRDT-2	**2014/TODVAR-3**	2014	Sabour
5.	BRDT-3	**2014/TODVAR-2**	2014	Sabour
6.	DMT-3	**2014/TODVAR-1**	2014	UHS, Dharwad

4 Chillies –AVT-II

S.No.	Entry	CODE	Year	Source
1.	Indira Chilli-3	**2014/CHIVAR-3**	2014	Raipur
2.	Jch-712	**2014/CHIVAR-9**	2014	Jagudan
3.	LCA-639	**2014/CHIVAR-2**	2014	Lam
4.	LCA-655	**2014/CHIVAR-6**	2014	Lam
5.	Punjab Tej	**2014/CHIVAR-7**	2014	Ludhiana
6.	SH-KC- 69	**2014/CHIVAR-1**	2014	Srinagar
7.	HC-69	**2014/CHIVAR-8**	2014	Ranchi
8.	HC-70	**2014/CHIVAR-5**	2014	Ranchi
9.	BCCH-10	**2014/CHIVAR-10**	2014	Kalyani
10.	CITH-HP-4	**2014/CHIVAR-4**	2014	CITH

5 Pea (Early) AVT-II

Sl. No.	Entry	CODE	Year	Source
1.	VP 1228	**2014/PEVAR-6**	2014	VPKAS
2.	VP 1355	**2014/PEVAR-3**	2014	VPKAS
3.	KS-603	**2014/PEVAR-5**	2014	Kalyanpur
4.	NP-20	**2014/PEVAR-2**	2014	Nirmal
5.	GP-904	**2014/PEVAR-4**	2014	IARI
6.	VRPE-100	**2014/PEVAR-7**	2014	IIVR
7.	VRPE-101	**2014/PEVAR-1**	2014	IIVR

6 Pea (Mid-Season) AVT-II

Sl. No.	Entry	CODE	Year	Source
1.	VP 1208	**2014/PMVAR-3**	2014	VPKAS
2.	VP 1219	**2014/PMVAR-1**	2014	VPKAS
3.	IIHR 2-2	**2014/PMVAR-2**	2014	IIHR
4.	IIHR 12	**2014/PMVAR-4**	2014	IIHR
5.	VRPM-50	**2014/PMVAR-5**	2014	IIVR

7 Cowpea (bush) AVT-II

Sl. No.	Entry	CODE	Year	Source
1.	JDNVC-74	**2014COPBVAR-2**	2014	Jagudan
2.	RCV- 9	**2014COPBVAR-1**	2014	Durgapura
3.	RCV- 10	**2014COPBVAR-5**	2014	Durgapura
4.	PKB-4	**2014COPBVAR-3**	2014	UAS, Banglore
5.	PVCP-1	**2014COPBVAR-6**	2014	Pantnagar
6.	CP-55	**2014COPBVAR-4**	2014	IARI

8 French bean (bush) AVT-II

Sl. No.	Entry	Code	Year	Source
1.	VLFB 1112	**2014/FBBVAR-1**	2014	VPKAS
2.	PFB-4	**2014/FBBVAR-4**	2014	Pantnagar
3.	IIHR 6-5	**2014/FBBVAR-3**	2014	IIHR
4.	HAFB-2020	**2014/FBBVAR-2**	2014	RC-Ranchi

9 Dolichos bean AVT-II (Pole Type)

Sl. No.	Entry	Code	Year	Source
1.	IIHR 167-1	**2014/DOLPVAR-4**	2014	IIHR
2.	BCDB-5	**2014/DOLPVAR-3**	2014	Kalyani
3.	DB-10	**2014/DOLPVAR-1**	2014	IARI
4.	DB-15	**2014/DOLPVAR-2**	2014	IARI

10 Cucumber AVT-II

Sl. No.	Entry	CODE	Year	Source
1.	Sol Cue-113	**2014/CUCUVAR-3**	2014	Solan
2.	DC-83	**2014/CUCUVAR-1**	2014	IARI
3.	DC-22	**2014/CUCUVAR-2**	2014	IARI
4.	VRCU-05	**2014/CUCUVAR-4**	2014	IIVR

11 Sponge gourd AVT-II

Sl. No.	Entry	CODE	Year	Source
1.	DSG-43	**2014/SPGVAR-3**	2014	IARI
2.	DSG-33	**2014/SPGVAR-6**	2014	IARI
3.	KSG-2	**2014/SPGVAR-2**	2014	Kanpur
4.	KSG-3	**2014/SPGVAR-5**	2014	Kanpur
5.	VRSG-1	**2014/SPGVAR-1**	2014	IIVR
6.	VRSG-1-12	**2014/SPGVAR-4**	2014	IIVR

12 Pumpkin AVT-II

Sl. No.	Entry	CODE	Year	Source
1.	KP 07-1	**2014/PUMVAR-4**	2014	Kalyanpur
2.	NDPK-11-10	**2014/PUMVAR-1**	2014	Faizabad
3.	P-1383-3	**2014/PUMVAR-3**	2014	Ludhiana
4.	Punjab Samrat	**2014/PUMVAR-5**	2014	Ludhiana
5.	VRPK-09-01	**2014/PUMVAR-2**	2014	IIVR

13. Mustard Green/Laipatta(Brassica Juncea) AVT-II

Sl. No.	Entry	CODE	Year	Source
1	Megha Laipatta-1	**2014/MGVAR-4**	2014	Barapani
2	Megha Laipatta-2	**2014/MGVAR-3**	2014	Barapani
3	UHF VR-12-1	**2014/MGVAR-1**	2014	Ranichauri
4	UHF VR-12-2	**2014/MGVAR-2**	2014	Ranichauri

HYBRID TRIALS

1. Brinjal Hybrid Long AVT-II

Sl. No.	Entry	Code	Year	Source
1.	NBH 317	**2014/BRLHYB-3**	2014	Nath Biogenes
2.	NDBH-11-4	**2014/BRLHYB-5**	2014	Faizabad
3.	NDBH-11-44	**2014/BRLHYB-1**	2014	Faizabad
4.	Kanak Durga	**2014/BRLHYB-2**	2014	Nuziveedu
5.	DBHL-211	**2014/BRLHYB-6**	2014	IARI
6.	DBHL-215	**2014/BRLHYB-4**	2014	IARI

2. Brinjal Hybrid Round AVT-II

Sl. No.	Entry	CODE	Year	Source
1.	PBHR-42	**2014/BRRHYB-2**	2014	Ludhiana
2.	NBH 386	**2014/BRRHYB-8**	2014	Nath Biogenes
3.	NBH-1001	**2014/BRRHYB-3**	2014	Nirmal Seed
4.	NBH-1465	**2014/BRRHYB-5**	2014	Nirmal Seed
5.	Jayant	**2014/BRRHYB-7**	2014	MSSC, Akola
6.	Yashwant	**2014/BRRHYB-6**	2014	MSSC, Akola
7.	NDBH-11-1	**2014/BRRHYB-4**	2014	Faizabad
8.	NDBH-11-7	**2014/BRRHYB-1**	2014	Faizabad

3. Tomato Hybrid Det. AVT-II

Sl. No.	Entry	CODE	Year	Source
1.	KTH-314	**2014TODHYB-1**	2014	Kaveri seeds
2.	NTH 1831	**2014TODHYB-3**	2014	Nath Biogenes
3.	Arka Rakshak	**2014TODHYB-4**	2014	IIHR
4.	Arka Samrat	**2014TODHYB-5**	2014	IIHR
5.	Ranveer	**2014TODHYB-2**	2014	Ankur
6.	NTH-1752	**2014TODHYB-6**	2014	Nuziveedu
7.	NTH-1009	**2014TODHYB-7**	2014	Nuziveedu
8.	Indam-3001	**2014TODHYB-8**	2014	Indo-American

4. Chilli Hybrid AVT-II

Sl. No.	Entry	CODE	Year	Source
1.	KHPH-229	**2014/CHIHYB-3**	2014	Kaveri seeds
2.	CCH-12	**2014/CHIHYB-6**	2014	IIVR
3.	LCH-111	**2014/CHIHYB-7**	2014	Lam
4.	ARCH-177	**2014/CHIHYB-5**	2014	Ankur
5.	NCH-1773	**2014/CHIHYB-1**	2014	Nirmal
6.	NCH-1754	**2014/CHIHYB-2**	2014	Nirmal
7.	NCH-1122	**2014/CHIHYB-8**	2014	Nuziveedu
8.	NCH-2902	**2014/CHIHYB-4**	2014	Nuziveedu

5. Okra Hybrid AVT-II

Sl. No.	Entry	CODE	Year	Source
1.	NOH 1054	**2014/OKHYB-1**	2014	Nath Biogenes
2.	NOH-1648	**2014/OKHYB-4**	2014	Nirmal Seeds
3.	NOH-1758	**2014/OKHYB-6**	2014	Nirmal Seeds
4.	HYDHOK-6	**2014/OKHYB-8**	2014	Hyderabad
5.	HYDHOK-10	**2014/OKHYB-3**	2014	Hyderabad
6.	EW-26117	**2014/OKHYB-5**	2014	East-West Seed
7.	OH-6680	**2014/OKHYB-7**	2014	Syngenta
8.	DOH-1	**2014/OKHYB-2**	2014	IARI

6. Bitter gourd Hybrid AVT-II

Sl. No.	Entries	CODE	Year	Source
1.	DBGH – 157	**2014/BIGHYB-1**	2014	IARI
2.	DBGH – 234	**2014/BIGHYB-3**	2014	IARI
3.	Maina	**2014/BIGHYB-4**	2014	East-West Seed
4.	NBIH-2009	**2014/BIGHYB-2**	2014	Nuziveedu
5.	US-1315	**2014/BIGHYB-5**	2014	U.S. Agri

7. Sponge gourd Hybrid AVT-II

Sl. No.	Entries	CODE	Year	Source
1	RHRHYBSPG-2 (1x2)	**2014/SPGHYB-4**	2014	Rahuri
2	RHRHYBSPG-7 (7x8)	**2014/SPGHYB-6**	2014	Rahuri
3	NSGH-341	**2014/SPGHYB-1**	2014	Nirmal
4	DSGH-52	**2014/SPGHYB-7**	2014	IARI
5	DSGH-34	**2014/SPGHYB-3**	2014	IARI
6	VRSGH-1	**2014/SPGHYB-2**	2014	IIVR
7	VRSGH-2	**2014/SPGHYB-5**	2014	IIVR

RESISTANT VARIETAL TRIALS
AVT-II FOR DECODING IN DURGAPURA 2017-18

1. Okra (YVMV) Trial AVT-II

S. No.	Entries	Code	Year	Source
1.	AKO-107	**2014/OKYVRES-7**	2014	Akola
2.	JoL-09-5	**2014/OKYVRES-1**	2014	Junagadh
3.	VRO-109	**2014/OKYVRES-9**	2014	IIVR
4.	DOV-66	**2014/OKYVRES-4**	2014	IARI
5.	DOV-12	**2014/OKYVRES-6**	2014	IARI
6.	J. OKRA-1	**2014/OKYVRES-3**	2014	Jabalpur
7.	NOKH-1012	**2014/OKYVRES-11**	2014	Nuziveedu
8.	Tanvi	**2014/OKYVRES-2**	2014	MSSC, Akola
9.	Seli Special (SJB-01)	**2014/OKYVRES-8**	2014	Jammu
10.	US-1356	**2014/OKYVRES-10**	2014	U.S. Agri
11.	US-1382	**2014/OKYVRES-5**	2014	U.S. Agri

2. Tomato (ToLCV) AVT-II

Sl. No.	Entries	Code	Year	Source
1.	IIHR-329	**2014/TOLCVRES-3**	2014	IIHR
2.	IIHR-335	**2014/TOLCVRES-1**	2014	IIHR
3.	Indam-1004	**2014/TOLCVRES-4**	2014	Indo- American
4.	US-3140	**2014/TOLCVRES-2**	2014	U.S. Agri
5.	US-440	**2014/TOLCVRES-5**	2014	U.S. Agri

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16	**Tripura**	Dr. Biswajit Das Horticulture I/C AICRP (VC) ICAR Complex for NEH Tripura Centre, Lembucherra West Tripura-799210	09612812456	0381-2865537, 2376425	0381-2353725	0381-2865537	biswajitsom_dr@yahoo.co.in
17	**UAS, Bangalore**	Dr. Mrs.Savithramma Professor Deptt. of G & P UAS, Bangalore-580065	09448612557 (Dr.M.V.C. Gowda)			080-23434958	nesams@yahoo.com
18	**IASRI, N.D.**	Dr. Rajendra Prasad Head Division of Agri. Statistics IASRI, New Delhi	09811647837				rajender1066@yahoo.co.in rajender@iasri.res.in
Centres added later stage :							
1	**CHES, Bhuban-eswar**	Dr. G. S. Sahu PS & Head Central Horticultural Experiment Station Aiginia, Bhubaneswar-751019 (Orissa)	0986100782	0674-2471712	0674-2352218	0674-2471867	headches@rediffmail.com headchesb@iihr.ernet.in
2	**CITH Muktesh-war**	Dr. Raj Narayan Principal Scientist & Scientist In Charge ICAR-CITH Regional Station , Mukteshwar, Nainital (UK)	07409669250 07579405043				rajnarayan882013@gmail.com
3	**Cooch Behar**	Dr. Ranjit Chatterjee I/c Project Associate Department of Vegetable & Spices Crops UBKV, Cooch Behar	09434197862				ranchat22@rediffmail.com

S. No.	Centre	Address	Mobile	Phone (Office)	Phone (Res.)	Fax	Email
4	**Banda**	Dr Satya Vart Dwivedi Asso. Professor, College Of Horticulture Banda University of Agri. & Technology Banda, Uttar pradesh - 210001	09415720119				satyakvk@gmail.com
5	**Chitrakoot**	Dr. S. S. Singh Asstt. Prof. (Horticulture) Dept. Crop Sciences Faculty of Agriculture MGCGV Chitrakoot Satna (M.P.)	9161302691	07670265413			ssmgcgv@gmail.com
6	**UAS-GKVK Campus**	Dr S. Ramesh UAS-GKVK Campus, Bengaluru - 560065	9480704010	08023330277			Ramesh_uas6@rediffmail.com
Seed Companies							
1	**Ajeet Seeds Ltd.**	Mr. S.U. Deshmukh Ajeet Seeds Ltd. Gut No. 233, Chittegaon, Tq. Paithan, Dist. Aurangabad – 431 105 (M.S.)	09921882699	02431-251445, 251444		02431-251833	surendra.deshmukh@ ajeetseed.co.in
2	**Advanta eeds**	Dr. Krishan Prasad Director Advanta India Pvt. Ltd Koppa Road, Begur Bangalore-560068 (Karnataka)	09900793362 (Dr. M. Narasimha-09448056768)				krishna.prasad@goldenadvanta.com Dr. Krishan Prasad , Director Advanta India Pvt. Ltd , Krishnama House ,# 8-2-418, 4th Floor, Road No.-7,Banjara Hills, Hyderabad-500034 , AP
3	**Ankur Seeds**	Dr. (Ms.) Manju Vishwakarma Research Coordinator Ankur Seeds Pvt. Ltd. 27, New Cotton Market Layout, Nagpur-440 018 (M.S.)	09822220112	0712-2725117& 2726148		0712-2723455	mvishwakarma@ankurseeds.com mvishwakarma@hotmail.com
4	**Annaya Seeds**	Dr. Prashant Goel General Manager (R&D) Annaya Seeds Pvt. Ltd. 832, 25th Main, Sector - 1, HSR Layout, Bangalore - 560102, Karnataka	094102298299				prashantgpb@gmail.com

S. No.	Centre	Address	Mobile	Phone (Office)	Phone (Res.)	Fax	Email
5	**Basant Agro Tech**	Dr. A. B. Deotale Vegetable Breeder Basant Agro Tech Ltd. Opp. Panchayat Samiti Tajna Peth Akola-444001 (M.S.)		0724-2439250		0724-2438053	a.deotale@basantagro.com customercare@basantagro.cor Basant Agro Tech (I) Ltd. Near S.T.Workshop, Kaulkhe Akola. 444 044. Phone : 0724-2436321 0724-2436325 Website: www.basantagro.cor
6	**Bharat Nursery Pvt. Ltd.,**	Bharat Nursery, 60-A,Arabind Sarani, Kolkata - 700005					info@bharatnursery.com, arij1234@gmail.com
7	**Bhartiya Beej Nigam Ltd.**	Sri Baljeet Singh Kharbanda, Vice-chairman, Bhartiya Beej Nigam Ltd. A-25, Ring Road, Near LIC office, wasVikas, Rudrapur-263153 Distt.- Udham Singh Nagar (U.A.)	09756536350	05944-244257		05944-245840	baljeetbbnl@gmail.com beejnigam@gmail.com
8	**Beejo Sheetal**	Mr Suresh O. Agrawal, Chairman Beej Sheetal , Research Pvt. Ltd. Beej Sheetal Corner, Mantha Road, JALNA 431203 M.S. (India)	(S.N. Singh-Varanasi 9415228634)	02482-232588, 232717 Dr. Mirkhee-Res. Executive-02482-236588		02482-230398	bejosheetal@hotmail.com bejosheetal@rediffmail.com
9	**Bundel-khand seeds**	Dr Ajay Pal Singh Director, Bundelkhand seeds Pvt. Ltd., (Bundelkhand Seed Farm) , Chungi Number 4 Rd, Mankapur, Jalaun, Uttar Pradesh 285123					ajaypal1962@gmail.com
10	**Camson Bio Techno-logies Ltd**	Dr. Anurudh K. Singh Director Camson Bio Technologies Ltd, 223, 1st Man Road, Domlur 2nd Stage, Bangalore-560071	09968277222	0124-3219174			info@camsonbiotech-nologies.com
11	**Century Seeds**	Mr. R.S. Arora Managing Director Century Seeds Pvt. Ltd., Lusa Tower, BA, 22-24, Mangolpuri Industrial Area Phase-II, New Delhi-110 034	Dr. Mangat 09812027169 (Mob.)	011-27019890, 27017061, 247124500		011-7017568	hybrids@airtelmail.in

S. No.	Centre	Address	Mobile	Phone (Office)	Phone (Res.)	Fax	Email
12	**Clause India**	Dr. P. K. Singh Clause India Pvt. Ltd. 6-1-20/2 Walker Town Bhoiguda, Sikanderabad - 500025 (A.P)	09848335096				pramodkumar.singh@hmclause.com anu.radha@hmclause.com
13	**Doctor Seeds Pvt. Ltd.**	Mr. Jasminder Singh Punia, Doctor Seeds Pvt. Ltd., Regd. Office No.-5, 5th Floor, Carnival Shopping Complex, The Mall, Ludhiana-141001	09872647853				doctorseed@rediffmail.com
14	**Durga Seed Farm**	Sh. Umesh Gupta Durga Seed Farm, 172, Industrial Area Phase-I Chandigarh-16002	09872984554	0172-2650193 2656854		0174-2656854	durgaseeds@gmail.com
15	**East West Seeds**	Dr Sanjay Kumar Rai Area Manager (Research Trials), East West Seeds India Pvt. Ltd., C-21, Gautam Garden Colony, Shivapur Bypass Road,Varanasi-221003, UP	9792004124,				www.eastwestseed.com sanjay.rai@eastwestseed.com
16	**Emergent Genetics India Pvt. Ltd.**	Dr. Anil Chauhan Business Head Emergent Genetics India Pvt. Ltd., 8-2-120/86/5, Avenue:07, Road No. 3, Banjara Hills, Hyderabad-500034		040-23555412-419		040-23555393 / 378	rnd@emergentindia.net anil.ram.chauhan@monsanto.com
17	**Indo-American Hybrid Seeds**	Dr. K.P.V. Shetty Vice President (R&D)-Vegetables Indo-American Hybrid Seeds(India) Pvt. Ltd. 7th ,Banashankari-Kengeri Road, Channasandra, Bangalore-5060061	080-28611499	(For Bangalore office-080-26760111			kpvshetty@indamseeds.com arunjoshi@indamseeds.com Mr. Shreeshail, GM R&D, Veg. Science shreeshail@indamseeds.com
18	**J. K. Agri. Genetics**	Shri C. Ramkrishna General Manager (R&D) Hybrid Seeds, J. K. Agri. Genetics, Ltd. 1-10-177,4th floor,Varun Tower , Begumpet, Hyderabad-500016	(A.A.Despandey 09341186254)	040-55316858 040-66316838		040-27764943	info@jkseeds.net aadeshpande@jkseeds.net

S. No.	Centre	Address	Mobile	Phone (Office)	Phone (Res.)	Fax	Email
19	**Kaveri Seeds**	Dr. Bhushan, Manager, Vegetables, Kaveri Seeds Company Ltd., # 513B, 5th Floor Minerva Complex, S.D. Road Secunderabad-500003 (A.P.)	9000366643	040-23792051, 27721457			bhushana@kaveriseeds.in Dr N P Sharma Director (R&D), Kaveri Seeds Company Ltd. # 513B, 5th Floor Minerva Complex, S.D. Road Secunderabad-500003 (A.P.)
20	**Krishidhan Seeds**	Dr. Anup Karwa Krishidhan Seed Pvt. Ltd., Sai Capital , 9th Floor,Opposite ICC Complex , Sena Pati Bapat Road, Shivaji Nagar, Pune-411005 (M.S)	09415443806	02482-252328 020-2571400, 25661205		02482-232328	anupkarwa@krishidhanseeds.com
21	**Kesar**	Dr. Prashant Goel Vegetable Breeder (Seed Division) Kesar Enterprises Ltd. Khurpia Farm, Kiccha Distt.- U.S. Nagar-263148 (U.K.)	09410298299	05946-212953			prasantparuli@hotmail.com
22	**Kirtiman**	Dr. F. B. Patil Director (Reasearch) Kirtiman Agrogenetics Ltd Kirtiman Bhawan Plot No.-19M, Govind Nagar RTO, Station Road Aurangabad-431005 (M.S.)	09403682733 09158899391	0240-2344781, 6607000/02		0240-6607032	dr.fbkirtiman@gmail.com fbpatil@sify.com
23	**Mahyco Ltd.**	Dr. K.S. Ravi Head, Vegetable Research Centre Maharashtra Hybrid Seed Co. Ltd, Bettanagere Village Husker,Post - Dosanapura Hobli Bangalore North Taluk- 502123	09902999566 Dr. Mahesh Sajjan-Asstt. Breeder 09823797199	080-27700632 & 27737299		080-27737301	ravi.kankanallu@mahyco.co.in
24	**Meta Helix**	Dr. Mukesh Kumar Varshney Head- Vegetable Breeding Metahelix Life Sciences Ltd. Plot No. 3, KIADB 4th Phase, Bommasandra, Bangalore-560099	09900544924 (Dr Vindhyachal Prasad- Area sales officer-8930444706)	08110-420500		08110-415074	mukesh.varshney@meta-helix.com vindhyachal.prasad@ meta-helix.com

S. No.	Centre	Address	Mobile	Phone (Office)	Phone (Res.)	Fax	Email
25	**Nath Bio-Genes**	Dr. C. S. Pathak, Advisor- Vegetable Research Nath Bio-genes (India) Limited, Nath House, Nath Road, Aurangabad (Maharashtra) Pin: 431005 Tel:	9371778881	0240 – 2376314 to 17, 2376686, 2376687,2376905		0240 – 2376188	chandra.pathak@nathseeds.com
26	**New Delhi (N.S.C)**	The General Manager (Marketing) , National Seeds Corporation Ltd. Beej Bhawan, Pusa Complex , New Delhi-110 012		(Off) 011-4743682		011-5766462	nsc@ nalevsnl.net.in
27	**Nimbkar Seeds**	Shri A.R. Ghanekar Sr. Manager (R&D) Nimbekar Seeds, P.B. No. 23 , Phaltan-415523 (M.S.)		02166-222297&98			
28	**Nirmal Seeds Ltd**	Dr. J.C. Rajput Director Research Nirmal Seeds Ltd. Bhadgaon Road Pachora-424 201 (Jalgaon)	09422774504/ 0976446604	02596-244366-396		02596-244045	dricrajput@nirmalseedsindia.com
29	**Nuzi Veedu Seeds Ltd.**	Dr. S.K. Tripathi Sr. Vice President - Business Unit - Vegetable , Nuziveedu Seeds Ltd, 403, Nilgiri Apartment, Barakhamba Road, Connaught Place, New Delhi-110001.	09582158101 09971696833				sktripathi@nslindia.com
30	**NRI Agritech**	Dr. A.R. Satyanarayan Executive Director NRI Agritech Pvt. Ltd. 4-5-29/85, 4th Lane, Vidyanagar Guntur-522007 (A.P.)	09245769909	0863-2237788/ 2264216			alapatisatyan@yahoo.com nriagritech@gmail.com
31	**Noble Seeds Pvt. Ltd.**	Dr. S.K. Awasthi Noble Seeds Pvt. Ltd. Plot No. 16, Phase-1, HSIIDC, Kundli, Sonipat-131028, Haryana		013-02281300			awasthi@nobleseeds.org contact@nobleseeds.org
32	**Proagro PGS India Ltd.**	Dr. Arvind Kapoor Proagro PGS India Ltd. GM, A-305, Ansal Chamber No. 1, 3, Bhikaji Cama Place New Delhi - 110 066		011 - 6191163		011 - 6192084	

S. No.	Centre	Address	Mobile	Phone (Office)	Phone (Res.)	Fax	Email
	Sattva Seeds Pvt.Ltd.	Dr P.B.Holeyachi, Breeder, Sattva Seeds Pvt.Ltd., 1st Floor, VaniyaDevendra Nagar Road,Sai Nagar, Raipur,Chhattigarh-492006	9522228988				praveen.bh@sattvaseeds.com
33	**Seed Innovation**	Dr. B. S. Patil Vegetable Coordinator, Seed Innovation Pvt. Ltd., 501 Subhum Sirirampada, Plot No. 6-3-1090/A/1, Rajbhavan Road Somajiguda, Hyderabad-500082	09440800040	040-23170341			
34	**Seed Tec.**	Sh Nishant Rajarhia Seed Tec, C-39 Bharani Complex, Minister Road, Secunderabad-500003	040-39188821-27, 66311951			040-27842285	
35	**Seed Works/ U.S. Agri. Seeds**	Sri S.N. Jayasimha Plant Breeder/ St. Manager, Seeds Works India Pvt. Ltd., 167,COAL layour Sahakarnagar, Bangalore-560092	09845250356 (S.Thippaswamy-09449612082)	080-2354581, 23543173		040-23356359	sn.jayasimha@bayer.com s.thippeswamy@bayer.com
36	**Seminis Seeds**	Dr. Narendra Yadav Regional Manager (Trials), C/O UTWorldwide (I) Pvt. Ltd., Plot NO.A-1, Scooter India Ancillary Unit, Amausi Industrial Area,, Natherganj, Lucknow-226009 & Seminis Vegetable Seeds , Gut No. 24, Paithan Road, Chitegaon , Aurangabad , (M.S.) – 431 105	Dr. Narendra Yadav 09935033171	02431-251468-70		02431-251466	narendra.yadav@yahoo.com
37	**Shri Ram Bioseed Genetics India Pvt. Ltd.**	Sh. Satish Hegde Dy. Manager- Veg. Research Bioseeds Research India Pvt. Ltd. Plot No. 206, Road No.14, Jubilee Hills, Hyderabad- 500033 (A.P.)	09849732906	040-23555801-806		040-23555530	sbgi@bioseedindia.com satish.hegde@shrirambioseed.com

S. No.	Centre	Address	Mobile	Phone (Office)	Phone (Res.)	Fax	Email
38	**SPIC PHI Seeds Ltd**	Sh. C. Manykannan Asstt. Manager (BR) SPIC Ltd , Kelamangal Road, Hosur Cattle Farm Road, Hosur-635110 (T.N.)		04344 – 262253/ 262757		04344-262531	spichosur@eth.net
39	**Sreema Seeds Pvt. Ltd.**	The Sreema Seeds Pvt. Ltd. , N.H.-5, Naya chowk Madhupatna, Cuttack-753010 (Orissa)		0671-2345033, 2345573		0671-2343310	sreemaa_seeds@yahoo.com
40	**Sri Venkateswara Hybrid Seeds Company**	Sh. P. Sanath Kumar Sri Venkateswara Hybrid Seeds Company, Gosha Hospital Road, Adoni-518301 (A.P.)		08512-25249/ 253027		08512-253027	
41	**Sungro Seeds Ltd.**	Dr. S.K.Das Gupta Principal Scientist Sungro Seeds Ltd., 3rd Floor, Sungro Chamber, B.N. Block, Local Shopping Centre, Shalimar Bagh, Delhi – 110 052	09971995317	011-7488272, 7471117, 7472574 011-27488272, 27472574, 27475524		011-7470333, 7475525 011-27470333	shaibal.dasgupta@ sungroseeds.com dasgupta@sungroseeds.com
42	**Syngenta India Ltd.**	Dr. Ashish R. Patel Development Manager Syngenta India Ltd. Seed Sector, WAOGHOLI, Gate No. 2347 Pune -Nagar Road, Taluk, Haveli, Pune – 412 207	08806660728 (Ajeet More-09960696560)	020-30615304 020-27050283		020-27050468	asish.patel@syngenta.com ajit.more@syngenta.com
43	**Suraj Crop-sciences Ltd**	Dr. P.P. Singh Dy. GM (North & East India), Suraj Cropsciences Ltd. Sarthak Mall, 3rd Floor, Swami Vivekanand Marg, Near Sargasan Cross Road, Gandhinagar-382421	09889565511 [Dr. D.N. Singh 08128984566]				premadityasingh@gmail.com dnsinghtomar@gmail.com
44	**Tokita Seed India (P) Ltd.**	Dr. Ghanshyam Shukla AGM (R&D), Tokita Seed India (P) Ltd. 360,13th 'A' Main, 80 feet Road, A SectorYelahanka New Town, Bangalore-560064	09945394330	080-28460254		080-28460749	sham@tokitaindia.com

S. No.	Centre	Address	Mobile	Phone (Office)	Phone (Res.)	Fax	Email
45	**Tri Murti Plant Sciences Pvt. Ltd.**	Dr. S. K. Ghosh VP & Head (R&D) Tri Murti Plant Sciences Pvt. Ltd., 101, MGR Estates, Dwarakapuri Colony, Punjagutta, Hyderabad - 500 082,Telangana	08374633388				ghosh@trimurti.in
46	**Tulasi Seeds Pvt. Ltd.**	Dr. Jaywant Mawale Sr. Breeder (Veg.) Tulasi Seeds Pvt. Ltd. "Tulasi House" # 6-4-6, Arundelpet 4/5, Guntur-52202 (A.P.)	07893116668	0863-2321374, 2224947, 2223254, 2229300, 2256330, 2256331		0863-2221161	contact@tulasiseeds.com seeds@tulasigroup.com
47	**Uniphos Seeds (A Division of Adenta Ltd.)**	Dr. H. O. Bhushan Breeder (Tomato& Egg Plant) , Uniphos Seeds & Bio Genetics (A Division of Adenta Ltd.), 203-205, Iind floor , Bhuvana Towers, S.D. Road, Secunderabad-500003 (A.P.)		040-66284000		040-27890138	bhushanaho@uniphosseeds.com
48	**Unisem Agritech private Limited**	Dr. B.S.Sarala, R & D Head , Unisem Agritech private Limited, Ranebennur Karnataka, India	9480218629				saralaprabhudeva@gmail.com devkumarhn.unisemagritech@gmail.com
49	**Venntura Crop Sciences**	Dr. R. Gowri Sankar Rao., Vice President (R&D) Venntura Crop Sciences Pvt. Ltd. Door No.270F, Road No. 10, Jublee Hills, Hyderabad-500033(A.P.)	09490467603				gowri.venntura@gmail.com
50	**Vijay Seeds Co. Ltd.**	Sh. S. L. Indoria Sr. Research Officer Vijay Seeds Co. Ltd A-9/17 Additional Industrial Area, MZDC, Jalna-431203		02482-230654, 234247	02482-230345	02482-230499	
51	**Vishal Seeds Pvt. Ltd.**	Dr. D.C. Dwivedi Research Officer Vishal Seeds Pvt. Ltd. 8-2-108/3, Opposite Hastina Puram North, Nagarjuna Sagar Road, Vanasthalipuram Post, Hyderabad – 500070 (AP)		040-24244241, 24242385			vishalseeds@usa.net

S. No.	Centre	Address	Mobile	Phone (Office)	Phone (Res.)	Fax	Email
52	**Vivaswan Agritech Pvt. Ltd**	Dr. A. G. Zirpe, Director Research Vivaswan Agritech Pvt. Ltd., 125, Bhawani Peth, Gul Ali, Pune-411 042 (M.S.)		020-26386208			agzirpe@yahoo.com
53	**Vibha/ Sinnova**	Dr. C. Nagraja DGM (Veg. Research) Inspire Plot No. 2, Sector-1, Hudas Techno-Enclave, besides Birla Soft Hitech City Road, Madhapur, Hyderabad-500084	09010204075 (Dr. J.P. Srivastava-09450342470)				umashankar@vibhaseeds.com srivas.jp@sify.com
54	**VNR Seed**	Mr. Vimal Chawda Managing director, VNR Seeds Pvt Ltd. "Ratnagiri", Opp. R.K.College, G.E.Road, Raipur – 492001, C.G.	09981990330 (Parag Agarwal, breeder-9573678382)	0403-2434836			vimal.chawda@vnrseeds.com parag.agrawal@vnrseeds.com gomchi@vnrseed.com vnrseedbhilai@rediffmail.com
55	**Zeneca Agrochemical Ltd.**	Sh. R. Subramanian Development Manager Zeneca Agrochemical Ltd., 28, Dhandaythapani Nagar, 2nd Street, Katturpura, Chennai		044 - 4425381/4425382		044 - 4451480/4425390	
56	**Zuari Seeds Sciences Ltd.**	Dr. Sunil Kumar Bhatt Zuari Seeds Sciences Ltd., 8-2-418, Level 1, 2nd Floor, Krishnama House, Road No.7, Banjara Hills, Hyderabad-500 034, Telangna State	09515221982 (Dr. Vishwash Singh-09935655542, 08004312982)	040-23390184		040-23730310	sunilbhatt@adventz.com
Seed companies having MOU with ICAR – IIVR, Varanasi, UP							
1.	M/s Mali Agritech Pvt. Ltd.	Mr. Dhiraj Banerjee 80/1, Subhash Avenue, P.O.-Ranaghat, Distt.-Nadia (W.B.)	8293236323	03473-259993	03473-286358	03473-286358	maliseeds@gmail.com maliseed@yahoo.co.in
2.	M/s Haldighati Seeds corporation	Mr. Ashish Dwivedi Beej Bhawan, Navbahar Complex, Kankroli (Rajsamand) – 313324 Rajasthan	9414174031	02952-220131	02952-220131	02952-220131	ashishdwivedi78@rediffmail.com

S. No.	Centre	Address	Mobile	Phone (Office)	Phone (Res.)	Fax	Email
3.	M/s DNA Agri. Seeds Pvt. Ltd.	Mr. S.P. Singh Plot No. 37, Survey No. 15, Jayabheri Park, Komapally, Quthbullapur, Rangareddy, Telangana-501401	9415338916, 9666000811				dnaagriseeds@gmail.com
4.	M/s Ananya Agri Genetics (India) Pvt. Ltd.	Dr. P.P. Singh Flat No. 404, Shruti Tower, KPHB 6th Phase, Behind JNTU, Kukatpally 6th Phase, Kukatpally, Distt. Ranga Reddy-500072 (Telangana)	9889565511				ananyaseeds@gmail.com
5.	M/s Suraj Crop Sciences Limited	Dr. D.N. Singh Sarthak Mall, 3rd Floor, Near Sargasan Cross Road, Swami Vivekananda Marg, Gandhingar-382421 (Gujarat).	**8 1 2 8 9 8 4 5 6 6**				dnsinghtomar@gmail.com
6.	M/s Dinkar Seeds Pvt. Ltd.	Mr. K.C. Patel 34, Shreekrishna Complex, Opp. Civil Hospital, Himatnagar-383001 Distt. Sabarkantha (Gujarat)	9426508527				dinkarseeds@gmail.com
7.	M/s Bundelkhand Seeds Pvt. Ltd.	Mr. Ajay Pal Singh Moh. Rawtan, Near New Subzi Mandi, Jalaun-285123 (U.P.)	9415114208				ajaypal1962@gmail.com
8.	M/s Pure Line Agri Pro	Mr. Anzer-ul Islam 57-58 Khusboo Enclave Pilibhit Byepass, Bareilly-243006 (U.P.)	9466097066, 08439782811				pureline15@gmail.com, anzer.gene@gmail.com
9.	M/s RR Seeds Agri Tech Pvt. Ltd.	Dr. M.K. Devarajaiah Survey No-8/2, Haraganahally, Honagavadi (Post), Harihar, District- Davanagere -577601 (Karnataka)	**9 3 9 1 0 1 1 8 5 6 ,** **0 9 4 8 1 9 1 0 8 5 6**				rajdevraj80@gmail.com rrseedsagritech66@gmail.com
10.	M/s Kalash Seeds Pvt. Ltd.,	Dr. Nand Kumar Kunchge Bejo Sheetal Square, Mantha Road, Jalna-431203, Maharashtra	9422229398	+91-2482-244000	+9-2482-230398	+9-2482-230398	kalashseeds@gmail.com

S. No.	Centre	Address	Mobile	Phone (Office)	Phone (Res.)	Fax	Email
11.	Agri-Asia Seeds Pvt. Ltd.	Mr. Ajay Yadav Shankuntal Nagar, Behind Hotel Dawat, Mantha Road, Jalna-431203 (Maharashtra)	9823298940, 9511201877				agriasiaseeds@gmail.com
12.	M/s Bapna Seeds	Mr. Dinesh Bapna 333, Shahpura, Gogawa, Tq. & Post-Gogawa-451335, Distt. – Khargone (M.P.)	9424070701, 7287221350				bapnaseeds@gmail.com, dineshbapna@bapnaseeds.com
13.	M/s Taikojin Seeds LLP	Mr. Gopal Chiney Tosh House, 3rd Floor, P-32 & 33, India Exchange Place, Kolkata-700001	09434016366, 09804151675				taikojinseeds@yahoo.in
14.	M/s Ravi Hybrid Seeds Pvt. Ltd.	H.No. 3-5-839/6, LR Plaza, Flat No. 202, Hyderguda, Hyderabad-500029	9440905792				rabihybridseeds2025@gmail.com
15.	M/s Sadhan Seeds	Mr. A.C. Nene 51/A, Dr. Bhiwapurkar Road, Dhantoli, Nagpur-440012. (Maharashtra)	9970057830, 9561085303	0712-2424719			anandnene.ngp@gmal.com
16.	M/s VNR Seeds Pvt. Ltd.	Mr. Vimal Chawda Ratnagiri, First Floor, Near Kalda Nursing Home, Opp. Rajkumar College, G.E. Road, Raipur, 492001 (Chattisgarh)	9981990330	0771-3200334	0771-4280330		vimal.chawda@vnrseeds.com vsplro@rediffmail.com
17.	M/s Asha Enterprises	Mr. Hasan Shafique ”Batul” Plot No. 14, H. No. 917, Quetta Colony, Lakadganj Layout, Nagpur-440008.	9823034461	0712-2726098, 2769894			hasan@byagroinfra.com
18.	Eagle Seeds and Biotech. Ltd.,Indore	Mr Vaibhav Jain,MD, 117, Silver Sunchora Castle, 7 RNT Marg, Indore	9907153002				vaibhav@eagleseeds.com mstomar3@yahoo.com Dr M S Tomar, Head, Vegetables
19.	UAS Raichur	Dr VB.V.Tembhurne, Asso. Prof., (Gent. & Plant.Breed.), Agriculture College, UAS Raichur, Karnataka	8867196042				bvtembhurne@gmail.com
20.	Satlva Seeds Pvt. Ltd.,	Mr Sandeep Baranwal, M-102, Ramniketan, Infront of Bhawan School, Saddu, Raipur-492007	9896630900				sbaranwal@satlvaseeds.com

AICRP (VC) GROUP MEETING DETAILS

Group Meeting	Venue		Period
I.	Indian Agricultural Research Institute, New Delhi (U.T.)	-	Feb, 5-6, 1971
II.	Punjab Agricultural University, Ludhiana (Punjab)	-	May, 11-13, 1972
III.	University of Agricultural Sciences, Hebbal, Bangalore (Karnataka)	-	April, 8-11, 1975
IV.	Orissa University of Agriculture and Technology, Bhubaneshwar (Orissa)	-	May, 9-13, 1977
V.	Tamil Nadu Agricultural University, Coimbatore (Tamil Nadu)	-	March, 5-9, 1979
VI.	Mahatma Phule Krishi Vidyapeeth, Pune (M.S.)	-	June, 23-27, 1981
VII.	Haryana Agricultural University, Hisar	-	May, 16-19, 1983
VIII.	Rajendra Agricultural University, Bihar Agricultural College, Sabour (Bihar)	-	June, 6-10, 1985
IX.	Narendra Dev University of Agriculture and Technology (U.P.)	-	Jan., 13-16, 1987
X.	Kerala Agricultural University, Vellanikkara , (Kerala)	-	Aug., 20-23, 1988
XI.	Dr. Y.S.P.U.H. and Forestry, Solan (H.P.)	-	June, 4-7, 1990
XII.	Andhra Pradesh Agricultural University, Hyderabad (A.P.)	-	Jan., 6-9, 1992
XIII.	Jawahar Lal Nehru Krishi Vishwa Vidyalaya, Jabalpur (M.P.)	-	Jan., 6-9, 1993
XIV.	Indira Gandhi Krishi Vishwa Vidyalaya, Raipur (M.P.)	-	Feb., 2-5, 1995
XV.	Banaras Hindu University, Varanasi (U.P.)	-	Mar., 25-28, 1996
XVI.	Tamil Nadu Agricultural University, Coimbatore (Tamil Nadu)	-	May, 28-31, 1997
XVII.	Mahatma Phule Krishi Vidyapeeth, Rahuri, Pune Campus (M.S.)	-	June, 8-11, 1998
XVIII.	Punjab Agricultural University, Ludhiana (Punjab)	-	Oct., 11-14, 1999
XIX.	Indian Institute of Vegetable Research, Varanasi (U.P.)	-	Jan., 15-18, 2001
XX.	Kerala Agricultural University, Vellanikkara (Kerala)	-	April, 9-12, 2002
XXI.	Gujarat Agricultural University, Anand (Gujarat)	-	May, 25-28,2003
XXII.	ANGRAU, Hyderabad	-	May, 27-30, 2004
XXIII.	BCKV, Kalyani, West Bengal	-	April ,16-19, 2005
XXIV.	UAS, Dharwad	-	April, 22-24, 2006
XXV.	CCS HAU, Hisar	-	May, 3-6, 2007
XXVI.	Orissa University of Agriculture and Technology, Bhubaneshwar	-	Feb, 23-27,2008
XXVII.	Tamil Nadu Agricultural University, Coimbatore	-	Feb,12-15,2009
XXVIII.	Indian Institute of Horticultural Research, Bangalore	-	Jan., 16-19, 2010
XXIX.	Junagadh Agricultural University, Junagadh	-	Jan., 27-30, 2011
XXX.	G.B.P.U.A. &T., Pantnagar, Uttarakhand	-	Jan.,13-16, 2012
XXXI.	CSK HPKV, Palampur (H.P.)		May, 2-5, 2013
Mid Term	AICRP (VC) Annual Report 2012-13 (Supplementary)	-	Dec., 17-18, 2013
XXXII	IGKV, Raipur (C.G.)	-	June, 24-27, 2014
XXXIII	IIVR, Varanasi (U.P.)	-	May, 21-24, 2015
XXXIV	ICAR-IARI, New Delhi	-	May, 10-13, 2016
XXXV	ICAR-IIHR, Bengaluru	-	June, 24-27, 2017
XXXVI	RARI, Durgapura, Jaipur , Rajasthan	-	May, 18-21, 2018

	
Inagural session AICRP (VC) meet 2017-18	Lightening the lamp
	
Audiance in the hall	Audiance in the hall
	
Audiance in the hall	Audiance in the hall
	
DDG –Hort.	Session-I Performance Evaluation

	
Session-II Collection, Conservation & Evaluation of Germplasm	Session-III Varietal Evaluation
	
Session IV Hybrid Evaluation	Session IV Hybrid Evaluation-1
	
Session-V-Evaluation for Biotic and Abiotic Stresses	Session-VII Disease Management-1
	
Session-VII Disease Management	Session-VIII Physiology, Biochemistry and Processing

	
Session-IX Insect Pest Management	Session-X Seed Production
	
Session-XI Breeder Seed Production and Price Fixation	Session-XII Public Private Partnership
	
Session XIII Protected Cultivation -1	Plenary session

भाकृअनुप
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